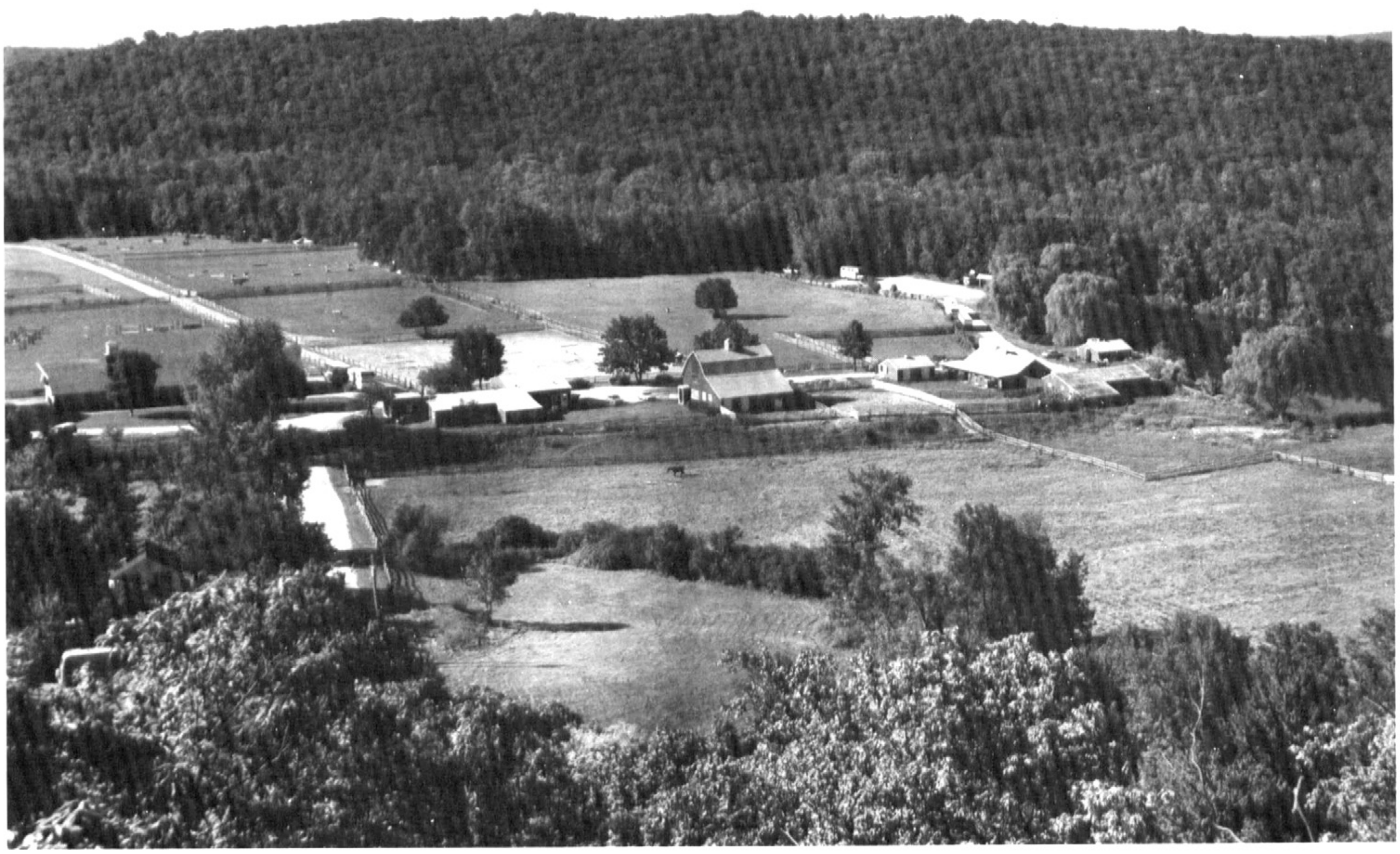
United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
Cornell University
Agricultural Experiment
Station

Soil Survey of Putnam and Westchester Counties, New York



How To Use This Soil Survey

General Soil Map

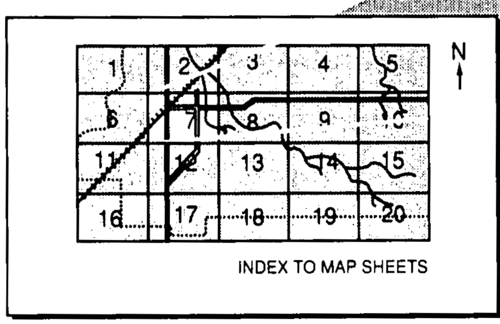
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

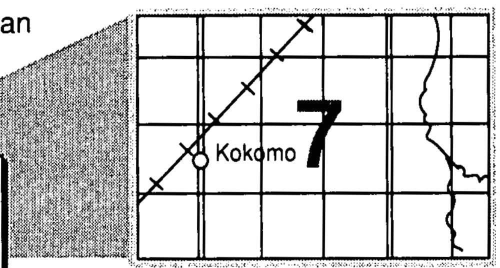
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.

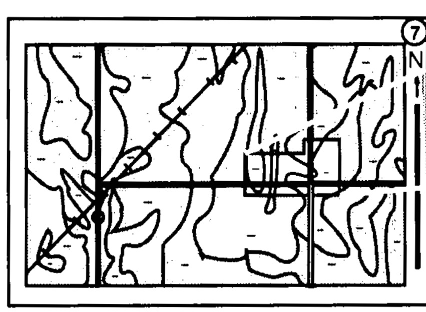


INDEX TO MAP SHEETS



MAP SHEET

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



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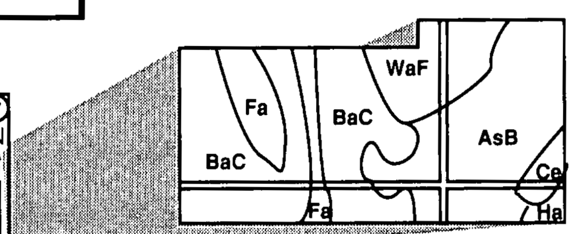

AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1986. Soil names and descriptions were approved in 1986. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1986. This survey was made cooperatively by the Soil Conservation Service and the Cornell University Agricultural Experiment Station. It is part of the technical assistance furnished to the Putnam and Westchester Counties Soil and Water Conservation Districts. Partial funding was provided by the Putnam and Westchester County Legislatures through their respective Soil and Water Conservation Districts.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: Panoramic view near the village of Bedford. The Riverhead and Hinckley soils in the valley are used for pasture. Charlton and Chatfield soils are in the background.

Contents

Issued September 1994

Index to Map Units

Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in Putnam and Westchester Counties. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Richard D. Swenson
State Conservationist
Soil Conservation Service

Soil Survey of Putnam and Westchester Counties, New York

By Stefan T. Seifried, Soil Conservation Service

Fieldwork by Albert N. Averill, Kipen J. Kolesinskas, Stephen J. Page, Lydia Schlosser, Stefan T. Seifried, Edward R. Stein, Theodore D. Trevail, and Keith A. Wheeler, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service, in cooperation with Cornell University Agricultural Experiment Station

PUTNAM AND WESTCHESTER COUNTIES are in the southeastern part of New York, east of the Hudson River (fig. 1). Putnam County is north of Westchester County. The county seat is Carmel. Westchester County is north of New York City. The county seat is White Plains. The survey area has a total of 428,800 acres, or about 670 square miles. Putnam County makes up slightly more than one-third of the area, and Westchester County makes up slightly less than two-thirds.

This survey updates an earlier soil survey of the White Plains area of Westchester County published in 1922 *(8)*. It provides additional information and larger maps, which show the soils in greater detail.

Less than 1.5 percent of the total acreage in the survey area is used for cultivated crops. The principal crops are apples, small fruits, and vegetables. Ornamental horticulture is an important land use in urban areas. A few large horse farms and a number of smaller ones are in northern Westchester County and eastern Putnam County, and some of the acreage is used for pasture. Approximately 40 percent of the survey area is forested, and at least 10 percent of the acreage is used for public recreational facilities.

The population of the survey area, about 944,000, is classified entirely as urban. Almost all of the labor force works in New York City, in the industrialized areas of southern Westchester County, or in northern New Jersey.

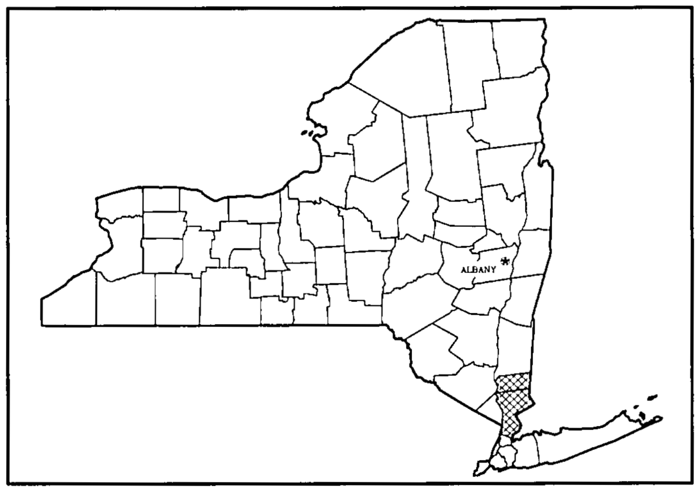

Figure 1.—Location of Putnam and Westchester Counties in New York.

General Nature of the Survey Area

This section provides general information about the survey area. It describes drainage, water supply, settlement and development, transportation facilities, physiography and geology, and climate.

Drainage

The eastern half of Putnam County is drained by tributaries of the Croton River. The western half is drained by streams flowing directly into the Hudson

River or by the tributaries of Canopus and Peekskill Hollow Creeks.

The major streams in the county generally follow preglacial stream valleys, whose alignment was determined by the structure or hardness of the underlying bedrock.

The northern part of Westchester County is drained by the Croton and Saw Mill Rivers and their tributaries. The east-central part is drained by small streams that flow across Connecticut and into Long Island Sound. The narrow southern part of Westchester County is drained by small streams that flow into the Hudson River or Long Island Sound.

Water Supply

The water resources in the survey area are predicted to become inadequate by the year 2000, when the demand for water will exceed the existing supplies. Some sections within the area have already experienced deficiencies. Since the early 1800's, the water resources in the area have been closely linked with the needs of New York City.

In both Putnam and Westchester Counties, individual wells, drilled primarily in the gneiss bedrock, provide water for domestic purposes. The quantity and quality of the water from the individual wells vary, but none of the wells is adequate to supply community needs. Few, if any, wells in unconsolidated material provide substantial amounts of water.

In the mid and late 1800's, New York City started to develop water impoundments to supply the ever-increasing needs of the city. Dams were constructed along the Croton River and its tributaries, and the water was brought to the city through a system of aqueducts. Among the larger lakes that were created are the East and West Branch and Croton Falls Reservoirs in Putnam County and the Amawalk, Titicus, New Croton, and Kensico Reservoirs in Westchester County. By agreement with New York City, the communities through which this water supply passes can withdraw stipulated amounts of water for their needs. Individual communities that do not have access to the New York City water supply have constructed water impoundments of their own. In northeastern Westchester County, a few small impoundments provide water to communities in Connecticut. The water needs of the two counties are an integral part of the needs of the greater metropolitan area of New York City and of the entire southeastern part of New York.

Settlement and Development

Algonquin Indians were the original inhabitants of the survey area. The area now known as Putnam County was initially part of Dutchess County. Putnam County was established as a separate political entity in 1812. Until the period of the Revolutionary War, most of the land that is now Putnam County was owned by members of the Philipse family. After the war, the lands belonging to the Philipse family were confiscated and sold, primarily to tenant farmers. Because travel was difficult in the western part of the county, most of the development was centered in the eastern half.

Putnam County has experienced rapid population growth in recent times. In 1820, the population of the county was almost 12,000. In 1940, the population was 16,555. A decade later it had increased to 20,300, and by 1969, it was more than 50,000. Although the population in the villages of Brewster, Cold Spring, and Nelsonville has declined in the last decade, this decline was more than offset by an increase in population in such towns as Carmel, Kent, and Putnam Valley, which are in the central part of Putnam County.

Early settlers found the area heavily wooded, principally with maple and oak and other hardwoods. During the Civil War, the foundry in Cold Spring produced a large share of the armament for the Union forces. In the years following the war, the foundry produced locomotives, engines, structural iron, and many other peacetime iron goods.

The mountains of the area were a source of high-grade iron ore and of wood for the charcoal used in the production of iron. Although more than half of the acreage in Putnam County is forested, most of this woodland is second- or third-growth timber because the demand for charcoal was so great.

Putnam County offers many recreational opportunities. It has long been known as a summer resort area. Many facilities for summer vacationers are throughout the county, including private and semiprivate vacation camps, individual summer homes, boarding houses, and hotels. In addition to the several smaller town parks, there are two large State parks. Clarence Fahnestock Memorial Park in the towns of Putnam Valley, Kent, and Philipstown provides opportunities for hiking, camping, picnicking, boating, and fishing. The Appalachian Trail traverses the length of this park. The Hudson Highlands State Park, in the northwest corner of Philipstown, offers excellent rough-country hiking trails and magnificent views of the Hudson River. A few private golf courses and skiing facilities are scattered throughout the county.

Westchester County was established in 1865. Its original boundaries included a section that is now part of New York City. Early settlement in the county was confined to the areas bordering Long Island Sound and the Hudson River. Much of the landholdings were in the form of large manors or estates. Westchester County

was the scene of considerable battle activity during the Revolutionary War. Expansion before and after the war was more rapid in the eastern and southern parts than in other parts of the county.

Although the population in Westchester County was slightly more than 1,000 in the year 1700, it had exceeded 27,000 by 1800. The population in 1890 was more than 145,000, and the majority was nonrural. By 1920, however, the population was more than 340,000, and less than 14 percent of the population in that year was rural. The rate of population growth in the early and mid 1900's was considerably slower in Westchester County than in Putnam County. The population is still concentrated in the urban areas in the southern part of Westchester County and in bands along the Hudson River to the city of Peekskill in the northwestern part. Several smaller population centers, such as Mount Kisco and Yorktown Heights, are in the north-central part of the county.

In the early years of its development, Westchester County was as heavily forested as Putnam County. With the rapid development of the urban areas, however, the proportion of woodland decreased rapidly. Today, considerably less than one-half of the county is used as woodland. Most of the wooded areas are within the confines of public lands or are on the few remaining large estates. Almost all of the woodland is second- or third-growth timber.

Westchester County contains numerous and varied recreational facilities. Several State parks, such as Franklin D. Roosevelt State Park in the northern part of the county, provide opportunities for golfing, swimming, picnicking, and hiking. County facilities are even more numerous and offer a wide range of activities that include camping areas and nature trails. Most of the towns and municipalities have developed local parks. A number of public and private boat marinas provide facilities on the Hudson River and on Long Island Sound. Golf courses, some of championship quality, are numerous throughout the county. For those interested in historical sites, several estates dating from the early historical periods have been restored and are open to the public.

Transportation Facilities

Transportation facilities in the survey area are part of the complex serving the megalopolis whose focal point is New York City. Railroads provide one of the major forms of passenger and freight transportation.

The southern part of Westchester County has a local bus transit system. Both counties are served by several of the major bus companies that have terminals in New York City.

A network of high-speed, limited-access highways links the survey area to New York City, upstate New York, and the New England states. The New York State Thruway system serves southwestern Westchester County via the Tappan Zee Bridge. In addition to the New York State Thruway, southern Westchester County is served by the Saw Mill River Parkway, the Sprain Brook-Bronx River Parkway, the Hutchinson River Parkway, and the New England Thruway. The Cross County Parkway and Cross Westchester Parkway serve as east-west links in the densely populated part of southern Westchester County. The central and northern parts of Westchester County are served by the Taconic and Saw Mill River Parkways and Interstate Highway 684. The western part of Westchester County is served by U.S. Route 9. This highway, along with the Taconic Parkway and Interstate Highway 684, provides access to and through Putnam County. All three of these highways connect with Interstate Highway 84. Federal Highway 6 provides another east-west link between Putnam and Westchester Counties. This network of highways has allowed for rapid urban growth in both counties.

In addition to the three major airports that serve the greater metropolitan area of New York City, several smaller airfields, including the Westchester County Airport northeast of White Plains, provide regularly scheduled commercial passenger service in addition to air freight and private craft facilities. A small seaplane base is south of the city of Peekskill. The Mahopac Airport in Putnam County provides facilities for small private aircraft.

The Hudson River is a major water route for heavy freight. A number of the major industries in Westchester County have docking facilities on the river for freight barges. The various boat marinas and yacht clubs along the Hudson River and Long Island Sound provide facilities for small boats.

Physiography and Geology

Bernard S. Ellis, senior staff geologist, Soil Conservation Service, helped prepare this section.

Putnam and Westchester Counties lie in the southeast corner of New York State, just north of New York City. They are mainly within the New England uplands physiographic province. The New England uplands area is geologically complex and exhibits moderate relief. Landforms in the area show a strong correlation to the relative hardness of the underlying bedrock. Elevation ranges from 200 to 500 feet above mean sea level in southern Westchester County and is more than 1,000 feet in the Hudson highlands *(3)*. The highlands extend from the southwest corner of

Rockland County, which is west of the Hudson River, through northern Westchester County and into Putnam County.

The survey area is largely underlain by a heavily metamorphosed complex of Precambrian and Paleozoic sedimentary and igneous rocks (see the "General Geology Map" at the back of this survey). For the most part, the dominant outcrops are gneiss, schist, and granite *(6)*. Hollis soils formed over these rocks.

The basic pattern of hills and valleys reflects the structure and variation in composition of the underlying bedrock. Streams followed softer, more easily eroded rock units and zones that were more intensely fractured along structural breaks or faults. This topographic pattern was further modified by the intense erosion caused by the continental glaciers that moved southward as far as Long Island and northern New Jersey. Further modification took place as the glaciers melted and retreated, leaving a complex sedimentary covering or overburden of moraines, terraces, outwash plains, lakes, and marshes.

An exception to this ridge-and-valley topography is in the Cortlandt area in northwestern Westchester County. The Cortlandt area is an oval-shaped complex of basic igneous intrusive rocks. It is characterized by short streams and an irregular topographic pattern.

The two counties were affected in essentially the same way by glaciation. Initially, as the glacial ice moved down over the area, the bedrock surface was scoured and eroded *(4)*. Glacial till, which is a mixture of gravel, sand, silt, and clay, was deposited under the ice and, in some cases, in front of the ice face. Charlton and Paxton soils are the major soils in the survey area that formed in glacial till.

When the ice front stalled and subsequently retreated, glacial meltwater deposited stratified gravel and sand in many areas, particularly in the major valleys. Riverhead soils are common in these outwash deposits.

Glacial lakes formed as the meltwater occupied low areas. Silt and very fine sand dominate the deposits in these lakes. Raynham soils formed in these types of deposits.

The thickest glacial deposits are in the Hudson River Valley. The thickness of these deposits exceeds 500 feet in some places in the valley.

The bedrock geology of Putnam and Westchester Counties includes a variety of rocks and formations, ranging in relative age from the Middle Proterozoic (Precambrian) to the Upper Triassic (Mesozoic). The following paragraphs describe the types of bedrock in the survey area. The symbols in parentheses are defined in the legend of the "General Geology Map" at the back of this survey.

Rocks of the Proterozoic age are metamorphic in nature. The origin of those from the Middle Proterozoic is uncertain. Rocks of the Upper Proterozoic originated from sedimentary and volcanic material. The oldest of the rocks are quartz plagioclase gneiss (qpg). These rocks may contain pyroxenes, horneblende, and biotite. Some areas are interbedded with amphibolite. This unit is located in the northwest corner of Putnam County. Other rocks of the Middle Proterozoic are biotite granitic gneiss (bg); amphibolite, pyroxenic amphibolite, and hornblende gneiss (am); garnet-bearing gneiss and interlayered quartzite (qtlg); and biotite-quartz-plagioclase gneiss (bqpc). These units occur mainly in Putnam County. Rocks of the Upper Proterozoic are Poundridge gneiss (pg), Yonkers gneiss (y), and Fordham gneiss (f). Poundridge gneiss is high in biotite or hornblende quartz-feldspar, or both. Yonkers gneiss consists of biotite and hornblende quartz-feldspar gneiss. Fordham gneiss includes garnet-biotite-quartz-plagioclase gneiss and amphibolite, sillimanite-garnet schistose gneiss and quartzite, and garnet-biotite-quartz plagioclase gneiss and amphibolite.

The oldest rocks of Paleozoic age are from the Hartland Formation (?Oht). These rocks consist of basal amphibolite overlain by pelitic schists. Next in age is Harrison gneiss (?Ohr), which is biotite-hornblende-quartz plagioclase gneiss and contains garnet and sphene. Bedford gneiss (?Ob) is next in age, followed by the Manhattan Formation (?Om). Other Paleozoic rocks are from the Middle and Upper Ordovician period. They are Stockbridge marble (OEst), Inwood marble (OEi), the Walloomsac Formation (Owl), olivine pyroxene (Oopx), and hornblende norite (Ohn).

The youngest rocks in the survey area are from the Devonian period of the Paleozoic era. They are intrusions of muscovite-biotite granodiorite (Dpgd).

Climate

By A. Boyd Pack, Ph.D., senior research associate, Division of Atmospheric Sciences, Department of Agronomy, Cornell University, Ithaca, New York.

Despite the close proximity of the Atlantic Ocean, Putnam and Westchester Counties have a continental climate. Airflow and weather systems that affect the area are primarily of continental origin. The climate also is designated as humid because the major circulation patterns of the atmosphere carry generous quantities of moisture toward the northeastern United States.

The Atlantic Ocean and Long Island Sound play a secondary but important role in the climate. The maritime influence results in a considerable moderation of winter temperatures and an extension of the frost-free period. The large body of water nearby adds considerable moisture to the atmosphere through the

process of evaporation, and the humidity tends to be high.

Winters are short but moderately cold. The transition from wintry temperatures to more springlike conditions is usually in mid-March. Summers are warm and include occasional periods of sultry, uncomfortable weather. The autumn season is pleasantly warm and often extends into early November.

The climate is modified somewhat by elevation and by the more hilly terrain in parts of the survey area. These factors are less important in Putnam and Westchester Counties, however, than elsewhere in the southeastern part of New York State.

Table 1 gives data on temperature for the survey area. In the average winter season, December through February, the temperature varies from 32 degrees F in the extreme southern part of Westchester County to about 27 degrees F in the northern part of the survey area. Minimum temperatures of 0 degrees F or colder occur on an average of 2 days per year near Long Island Sound, but in approximately one winter out of three the temperature remains above zero. In the more interior parts of the survey area, below-zero temperatures are generally recorded on 5 to 10 days per year. Extreme minimum temperatures of -10 to -12 degrees F have been recorded in southern Westchester County; temperatures from -15 to -20 degrees F have been recorded in the interior sections of Westchester County; and temperatures of -20 to -25 degrees F have been recorded in parts of Putnam County.

Maximum temperatures during the summer usually are in the 80-degree range. A maximum temperature of 90 degrees F or higher occurs on an average of 20 to 25 days per year, but 30 or more days of such temperatures have been noted in abnormally warm summers. Temperatures near 100 degrees F have been recorded on occasion, especially in the more densely populated areas of southern Westchester County.

The average frost-free season ranges from 170 to 190 days in most of the survey area. It ranges from 200 days in the extreme southern part of Westchester County to about 160 days in eastern Putnam County. The latest date in spring with a minimum of 32 degrees F or colder is about April 20 near Long Island Sound but is usually about the first week of May in the interior of the survey area. The date of the first freeze in fall ranges from October 10 in the interior to about October 25 along Long Island Sound and the shoreline of the Hudson River estuary.

Table 2 provides data on precipitation for the survey area. Annual precipitation averages from 44 to 48 inches. The heaviest accumulations tend to occur near the southern and eastern borders, with a few local areas having a yearly total of about 50 inches. During a recent 30-year period, total annual precipitation varied from less than 35 inches to more than 55 inches at regularly reporting stations.

Precipitation during the growing season is more than adequate for the growth of crops and other plants and for maintenance of the area's water resources. In most seasons, however, vegetation may suffer during temporary periods of insufficient rainfall. Total precipitation from May through September averages 20 to 23 inches.

From Long Island Sound to the northeastern interior of the area, the average winter snowfall ranges from 35 to 45 inches. Snowfall can vary considerably from year to year. During a recent 15-year period, individual stations measured snowfall ranging from 25 to about 85 inches. In coastal areas and in the lower parts of the survey area, the midwinter season is usually marked by alternating periods of no snow cover or a thin to moderate snow cover.

Compared with much of New York State, Putnam and Westchester Counties are relatively sunny during the winter months. The sun shines about 50 percent of the time possible in the survey area but only about 30 percent near the Great Lakes, for example.

The climate of the area is significantly affected by human activities, especially in southern Westchester County, where the population is very dense. These activities tend to alter the thermal properties and chemical composition of the atmosphere, at least in the lower layers. They also interfere with the natural hydrologic cycle. The extensive conversion of the land surface from natural soil and vegetation to concrete and asphalt can result in severe flooding from otherwise harmless summer thunderstorms.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, landforms, relief,

climate, and natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Some of the boundaries on the soil maps of Putnam and Westchester Counties do not match those on the soil maps of adjacent counties, and some of the soil names and descriptions do not fully agree. The differences are a result of improvements in the classification of soils, particularly modifications or refinements in soil series concepts. Also, there may be differences in the intensity of mapping or in the extent of the soils within the survey area. This survey area was mapped at a scale of 1:12,000. The survey of Fairfield County, Connecticut, was mapped at a scale of 1:15,840, and that of Dutchess County, New York, was mapped at a scale of 1:31,680. Bronx Borough, New York, to the south of Westchester County, does not have a modern published soil survey or general soil map.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes.
Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to

other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil Descriptions

Dominantly Medium Textured and Moderately Coarse Textured Soils Formed in Glacial Till; on Uplands

These soils are in the uplands. They make up about 77 percent of the survey area. They formed in glacial till derived mainly from granitic material, but some soils in small areas formed in glacial till derived from limestone, marble, and schist. The soils range from shallow to very deep. Most areas are wooded or are openland. Many areas are used for urban development.

1. Charlton-Chatfield

Very deep and moderately deep, well drained and somewhat excessively drained, medium textured soils; on uplands

The soils in this map unit formed in glacial till derived dominantly from granite, gneiss, and schist. The landscape is characterized by hills and rolling uplands that have complex topography. Bedrock outcrops are common. Slopes are dominantly 2 to 25 percent but range to as much as 45 percent.

This unit makes up about 28 percent of the survey area. It is about 40 percent Charlton soils, 20 percent Chatfield soils, and 40 percent soils of minor extent.

The very deep, well drained Charlton soils are gently sloping to very steep. They are on hilltops and hillsides. The rate of water movement is moderate or moderately rapid throughout the profile. The depth to bedrock is more than 60 inches.

The moderately deep, somewhat excessively drained and well drained Chatfield soils are gently sloping to steep. They are on hillsides and hilltops. The rate of water movement is moderate or moderately rapid throughout the profile. The depth to bedrock ranges from 20 to 40 inches.

Of minor extent in this unit are Hollis, Sutton, Leicester, Sun, Carlisle, and Palms soils. The shallow Hollis soils are well drained and somewhat excessively drained. They are on hilltops and hillsides. The very deep Sutton soils are moderately well drained. They are on the lower part of hillsides. The very deep Leicester soils are somewhat poorly drained and poorly drained. They are along small drainageways and in depressions. The very deep Sun soils are poorly drained and very poorly drained. They are in depressions. The very deep Carlisle and Palms soils are very poorly drained. They are in depressions. They formed in organic material.

Most areas of this unit are wooded or are used for community development. A few areas are used for hay or pasture. The moderate depth to bedrock, the scattered areas of bedrock outcrop, and the slope are limitations affecting community development and agriculture. The unit has good potential for recreational development and as wildlife habitat.

2. Charlton-Leicester

Very deep, well drained, somewhat poorly drained, and poorly drained, medium textured soils that have a stony surface layer; on uplands

The soils in this map unit formed in glacial till derived dominantly from granite, gneiss, and schist. The landscape is characterized by rolling uplands and valley sides below areas where bedrock outcrops are common (fig. 2). Slopes are dominantly 2 to 25 percent but range from 0 to 45 percent.

Figure 2.—Typical landscape in an area of the Charlton-Leicester general soil map unit. The somewhat poorly drained Leicester soils are in the low, nearly level area in the foreground, and the well drained Charlton soils are on the convex ridges and knolls in the background.

This unit makes up about 5 percent of the survey area. It is about 55 percent Charlton soils, 15 percent Leicester soils, and 30 percent soils of minor extent.

The well drained Charlton soils are gently sloping to very steep. They are on hilltops and hillsides. The rate of water movement is moderate or moderately rapid throughout the profile. Stones larger than 10 inches in diameter are about 3 to 25 feet apart on the surface. The depth to bedrock is more than 60 inches.

The somewhat poorly drained and poorly drained Leicester soils are gently sloping. They are on the lower part of hillsides and along drainageways. The rate of

water movement is moderate or moderately rapid in the surface layer and subsoil and moderate to rapid in the substratum. Stones larger than 10 inches in diameter are about 3 to 25 feet apart on the surface. The depth to bedrock is more than 60 inches.

Of minor extent in this unit are Hollis, Chatfield, Sutton, and Sun soils. The shallow Hollis soils are well drained and somewhat excessively drained. They are on hilltops and the upper part of hillsides. The moderately deep Chatfield soils are well drained and somewhat excessively drained. They are on hilltops and hillsides. The very deep Sutton soils are moderately well drained. They are on the lower part of hillsides. The very deep Sun soils are poorly drained and very poorly drained. They are in depressions.

Most areas of this unit are wooded. Some areas are used for recreational or community development. The slope and wetness are the main limitations affecting community development. The slope, the wetness, and the stones on the surface are limitations affecting farming. The unit has potential for recreational development and as wildlife habitat.

3. Paxton-Woodbridge

Very deep, well drained and moderately well drained, medium textured and moderately coarse textured soils; on uplands

The soils in this map unit formed in glacial till derived dominantly from granite, gneiss, and schist. The landscape is characterized by smoothly sloping hillsides and broad hilltops in the uplands (fig. 3). Slopes are dominantly 3 to 25 percent but range from 0 to 25 percent.

This unit makes up about 16 percent of the survey area. It is about 65 percent Paxton soils, 15 percent Woodbridge soils, and 20 percent soils of minor extent.

The well drained Paxton soils are gently sloping to moderately steep. They are on hilltops and hillsides. The rate of water movement is moderate in the surface layer and subsoil and slow or very slow in the substratum. The depth to bedrock is more than 60 inches.

The moderately well drained Woodbridge soils are nearly level to strongly sloping. They are on low, broad hilltops and the lower part of hillsides. The rate of water movement is moderate in the surface layer and subsoil and slow or very slow in the substratum. The depth to bedrock is more than 60 inches.

Of minor extent in this unit are the very deep Ridgebury, Sun, Carlisle, and Palms soils. Ridgebury soils are somewhat poorly drained and poorly drained. They are on the lower part of hillsides and along drainageways. Sun soils are poorly drained and very poorly drained. They are along small drainageways and in depressions. Carlisle and Palms soils are very poorly drained. They are in depressions.

Areas of this unit are wooded, or they are cleared and used for community development or farming. The slope, the seasonal wetness, and the slow rate of water movement in the substratum are limitations affecting community development and farming. The seasonal wetness and the slope also are limitations affecting recreational development.

4. Chatfield-Hollis-Rock Outcrop

Moderately deep and shallow, well drained and somewhat excessively drained, medium textured and moderately coarse textured soils and areas of Rock outcrop; on uplands

The soils in this map unit formed in glacial till derived from granite, gneiss, and schist. The landscape is characterized by very complex topography and steep microrelief and by very steep or nearly vertical bedrock escarpments. Slopes are dominantly 8 to 35 percent but range from 3 to 60 percent.

This unit makes up about 15 percent of the survey area. It is about 35 percent Chatfield soils, 35 percent Hollis soils, 15 percent Rock outcrop, and 15 percent soils of minor extent.

The moderately deep, well drained and somewhat excessively drained Chatfield soils are gently sloping to steep. They are on hillsides and hilltops. The surface layer is medium textured, and the subsoil is medium textured or moderately coarse textured. The rate of water movement is moderate or moderately rapid throughout the profile. The depth to bedrock ranges from 20 to 40 inches.

The shallow, well drained and somewhat excessively drained Hollis soils are gently sloping to very steep. They are on hillsides and hilltops. The surface layer is moderately coarse textured, and the subsoil is medium textured or moderately coarse textured. The rate of water movement is moderate or moderately rapid throughout the profile. The depth to bedrock ranges from 10 to 20 inches.

Rock outcrop occurs throughout the unit as exposures of granite, gneiss, or schist. The exposures are very steep or nearly vertical on hillsides and are gently sloping on hilltops.

Of minor extent in this unit are the very deep Charlton, Sutton, Leicester, Paxton, Sun, Carlisle, and Palms soils. Charlton soils are well drained. They are on hillsides. Sutton soils are moderately well drained. They are on the lower part of hillsides and in gently sloping or nearly level areas. Leicester soils are somewhat poorly drained and poorly drained. They are

Figure 3.—Typical landscape in an area of the Paxton-Woodbridge general soil map unit. Woodbridge soils are in the nearly level area in the foreground, and Paxton soils are on the ridge in the background.

along small drainageways. Paxton soils are well drained. They are on the lower part of hillsides. Sun soils are poorly drained and very poorly drained. They are in depressions. Carlisle and Palms soils are very poorly drained. They are in depressions.

Most areas of this unit are wooded, but some small areas are used for community development. The moderate or shallow depth to bedrock, the Rock

outcrop, and the slope are limitations affecting community development. Some areas of the unit have good potential for recreational development.

5. Stockbridge

Very deep, well drained, medium textured soils; on uplands

The soils in this map unit formed in glacial till derived dominantly from limestone, marble, and schist. The landscape is characterized by smooth hills and rolling uplands and is influenced in places by the underlying limestone bedrock. Outcrops of limestone or marble are in scattered areas. Slopes range from 3 to 25 percent.

This unit makes up less than 1 percent of the survey area. It is significant, however, and was identified separately because the soils in the unit formed in glacial till having a medium content of lime. The surrounding soils formed in glacial till having a low content of lime. The higher content of lime increases the pH and the base saturation, which is significant to use and management. The unit is about 65 percent Stockbridge soils and 35 percent soils of minor extent.

Stockbridge soils are gently sloping to moderately steep. They are on hilltops and hillsides. The rate of water movement is moderate in the surface layer and subsoil and slow in the substratum. The depth to bedrock is more than 60 inches.

Of minor extent in this unit are the very deep Sutton, Leicester, and Sun soils. Sutton soils are moderately well drained. They are on hillsides and in gently sloping or nearly level areas. Leicester soils are somewhat poorly drained and poorly drained. They are along small drainageways and in depressions. Sun soils are poorly drained and very poorly drained. They are in depressions.

Areas of this unit are wooded or are cleared and used for farming. A few areas are used for community development. The slope is a limitation affecting community development and farming in some parts of the unit. A moderate potential for frost action and the slow rate of water movement in the substratum are additional limitations affecting community development.

6. Charlton-Sutton

Very deep, well drained and moderately well drained, medium textured soils; on uplands

The soils in this map unit formed in glacial till derived dominantly from granite, gneiss, and schist. The landscape is characterized by hills and rolling or undulating uplands. Slopes are dominantly 3 to 25 percent but range from 0 to 45 percent.

This unit makes up about 13 percent of the survey area. It is about 60 percent Charlton soils, 10 percent Sutton soils, and 30 percent soils of minor extent.

The well drained Charlton soils are gently sloping to very steep. They are on hilltops and hillsides. The surface layer is medium textured, and the subsoil and substratum are moderately coarse textured. The rate of water movement is moderate or moderately rapid throughout the profile. The depth to bedrock is more than 60 inches.

The moderately well drained Sutton soils are nearly level and gently sloping. They are on the lower part of hillsides and are on flats or in depressions in the uplands. The surface layer is medium textured, and the subsoil and substratum are medium textured or moderately coarse textured. The rate of water movement is moderate or moderately rapid throughout the profile. The depth to bedrock is more than 60 inches.

Of minor extent in this unit are Hollis, Chatfield, Leicester, and Sun soils. Hollis soils are shallow and are somewhat excessively drained. They are on hilltops and the upper part of hillsides. Chatfield soils are moderately deep, well drained, and somewhat excessively drained. They are on hilltops and hillsides. Leicester soils are very deep and are somewhat poorly drained and poorly drained. They are along small drainageways and in depressions. Sun soils are very deep and are poorly drained and very poorly drained. They are in depressions.

Many areas of this unit are used for community development. Some areas are used for farming or are wooded. The slope and the seasonal wetness are limitations affecting community development. The slope also is a limitation affecting farming and recreational development.

Dominantly Medium Textured and Moderately Coarse Textured Soils Formed in Glacial Outwash; on Plains and Terraces

These soils are mainly in valleys. They make up about 2 percent of the survey area. They formed in glacial outwash derived mainly from granitic material. They are very deep and are well drained and somewhat excessively drained. Slopes are nearly level to steep.

7. Riverhead-Knickerbocker

Very deep, well drained and somewhat excessively drained, medium textured and moderately coarse textured soils; on outwash plains and terraces along valley sides

The soils in this map unit formed in glacial outwash derived mostly from sandy or gravelly deposits. The landscape is characterized by nearly level stream

terraces and rolling or hilly to very steep valley sides. Slopes are commonly complex. They are dominantly 3 to 25 percent but range from 0 to 50 percent.

This unit makes up about 2 percent of the survey area. It is about 60 percent Riverhead soils, 20 percent Knickerbocker soils, and 20 percent soils of minor extent.

The well drained Riverhead soils formed in sandy and gravelly glacial outwash. They are nearly level to very steep. They are on outwash plains, stream terraces, and valley sides. The surface layer is medium textured, and the subsoil is moderately coarse textured material over sand and gravel. The rate of water movement is moderately rapid in the surface layer and subsoil and very rapid in the substratum. The depth to bedrock is more than 60 inches.

The somewhat excessively drained Knickerbocker soils formed in sandy glacial outwash and in stream deposits. They are gently sloping or strongly sloping. They are on outwash plains, stream terraces, and valley sides. The surface layer and the upper part of the subsoil are moderately coarse textured, and the lower part of the subsoil and the substratum are coarse textured. The rate of water movement is moderately rapid in the surface layer and in the upper part of the subsoil and rapid in the lower part of the subsoil and in the substratum. The depth to bedrock is more than 60 inches.

Of minor extent in this unit are the very deep Hinckley, Pompton, and Fredon soils. Hinckley soils are excessively drained. They are on valley sides, terraces, or small hills. Pompton soils are moderately well drained and somewhat poorly drained. They are on parts of terraces and outwash plains. Fredon soils are somewhat poorly drained and poorly drained. They are in depressions on terraces or outwash plains.

Some areas of this unit are wooded, but most are cleared and used for community development or farming or are mined for sand and gravel. In some areas the slope is a limitation affecting community development and agriculture. Nearly level or gently sloping areas of the unit are well suited to these purposes.

Dominantly Soils Formed in Organic Material and Alluvial Deposits; on Lowlands and Along Streams

These soils are in depressions and along streams. They make up about 4 percent of the survey area. They formed in well decomposed organic material and stratified alluvial deposits. The organic soils are very poorly drained. The soils that formed in alluvial sediments range from well drained to very poorly drained. They are very deep. Slopes are nearly level.

8. Carlisle-Palms-Fluvaquents

Very deep, very poorly drained, nearly level, organic soils and somewhat poorly drained to very poorly drained alluvial soils; on lowlands and along streams

The organic soils formed in well decomposed organic material and in well decomposed organic material over loamy mineral deposits. The alluvial soils formed in silty or sandy mineral deposits. The landscape is characterized by broad or elongated depressional areas that are crossed by meandering streams. Slopes range from 0 to 3 percent but are dominantly less than 1 percent.

This unit makes up about 4 percent of the survey area. It is about 35 percent Carlisle soils, 25 percent Palms soils, 15 percent Fluvaquents, and 25 percent soils of minor extent.

The very poorly drained Carlisle soils formed in well decomposed organic material derived from herbaceous and woody plants. They are in depressions in the lowlands. The surface layer and subsurface layer are well decomposed muck. The rate of water movement ranges from moderately slow to moderately rapid throughout the profile. The depth to bedrock is more than 60 inches.

The very poorly drained Palms soils formed in well decomposed organic material derived from herbaceous and woody plants. They are in depressions in the lowlands. The surface layer and subsurface layer are well decomposed muck over a loamy mineral substratum. The rate of water movement is moderately slow to moderately rapid in the organic layers and moderate or moderately slow in the mineral substratum. The depth to bedrock is more than 60 inches.

Fluvaquents formed in recent sandy or silty alluvial deposits. These soils are along streams in the lowlands. They are frequently flooded. The flooding and the resulting deposition make the properties of these soils highly variable. The soils are somewhat poorly drained to very poorly drained. The surface layer and substratum range from silty material to sandy material. The rate of water movement varies with the kind of deposit. The depth to bedrock is more than 60 inches.

Of minor extent in this unit are Udifluvents and the very deep Ipswich, Pompton, Fredon, and Raynham soils. Udifluvents are well drained and moderately well drained. They are mapped with Fluvaquents on flood plains. Ipswich soils are very poorly drained. They are in areas along the Hudson River and Long Island Sound. Pompton soils are moderately well drained and somewhat poorly drained. They are near streams or along the edges of the lowlands. Raynham and Fredon soils are in small depressions or along the edges of larger depressions in the lowlands. Fredon soils are

somewhat poorly drained and poorly drained. Raynham soils are poorly drained.

Areas of this unit are mostly wooded, or they have a cover of brush or water-tolerant herbaceous plants. The wetness, ponding, flooding, frost action, and low soil strength are limitations affecting community development and farming. The unit has good potential as habitat for wetland wildlife.

Dominantly Urban Land and Medium Textured and Moderately Coarse Textured Soils Formed in Glacial Till; on Uplands

The map units in this group are on uplands, mainly in the southern part of Westchester County. They make up about 17 percent of the survey area. The soils formed in glacial till derived mainly from granitic material. They are somewhat excessively drained to moderately well drained. They are very deep and moderately deep and are nearly level to steep.

9. Urban land-Charlton-Chatfield

Urban land and very deep and moderately deep, well drained and somewhat excessively drained, medium textured soils; on uplands

The soils in this map unit formed in glacial till derived dominantly from granite, gneiss, and schist. The landscape is characterized by hills and rolling uplands that have complex topography. Bedrock outcrops are common. Slopes are dominantly 2 to 25 percent but range to as much as 35 percent. The density of urban development generally decreases as the slope increases. It is greatest in areas near lowlands.

This unit makes up about 9 percent of the survey area. It is about 50 percent Urban land, 15 percent Charlton soils, 15 percent Chatfield soils, and 20 percent soils of minor extent.

Urban land consists of areas covered by buildings, streets, parking lots, and other impervious surfaces (fig. 4). The natural soil layers have been altered or mixed with other material, such as bricks, broken concrete, or cinders. Properties of the soils are so variable that they can be determined only by onsite investigation.

The very deep, well drained Charlton soils are gently sloping to steep. They are on hilltops and hillsides. The surface layer is medium textured, and the subsoil and substratum are moderately coarse textured. The rate of water movement is moderate or moderately rapid throughout the profile. The depth to bedrock is more than 60 inches.

The moderately deep, well drained and somewhat excessively drained Chatfield soils are gently sloping to steep. They are on hillsides and hilltops. The surface layer is medium textured, and the subsoil is moderately coarse textured. The rate of water movement is moderate or moderately rapid throughout the profile. The depth to bedrock ranges from 20 to 40 inches.

Of minor extent in this unit are Udorthents and Hollis, Sutton, Leicester, and Sun soils. Udorthents are very deep and are excessively drained to somewhat poorly drained. They have been disturbed or altered, usually by cutting or filling. They occur throughout the unit. Hollis soils are shallow and are well drained and somewhat excessively drained. They are on hilltops and hillsides. Sutton soils are very deep and moderately well drained. They are on the lower part of hillsides and in gently sloping or nearly level areas. Leicester soils are very deep and are somewhat poorly drained and poorly drained. They are along small drainageways and in depressions. Sun soils are very deep and are poorly drained and very poorly drained. They are in depressions.

The slope, the moderate depth to bedrock, and the scattered areas of rock outcrop are limitations affecting community development. The slope and the rock outcrop also are limitations affecting recreational development.

10. Urban land-Paxton-Woodbridge

Urban land and very deep, well drained and moderately well drained, medium textured and moderately coarse textured soils; on uplands

The soils in this map unit formed in glacial till derived dominantly from granite, gneiss, and schist. The landscape is characterized by smoothly sloping hillsides and broad hilltops with some intervening lowlands that are dominantly Urban land. Slopes range from 0 to 25 percent.

This unit makes up about 8 percent of the survey area. It is about 50 percent Urban land, 20 percent Paxton soils, 15 percent Woodbridge soils, and 15 percent soils of minor extent.

Urban land typically consists of areas covered by buildings, streets, parking lots, and other impervious surfaces. The natural soil layers have been altered or mixed with other material, such as bricks, broken concrete, or cinders. Properties of the soils are so variable that they can be determined only by onsite investigation.

The well drained Paxton soils are gently sloping to moderately steep. They are on hilltops and hillsides. The surface layer is moderately coarse textured, and the subsoil and substratum are medium textured and moderately coarse textured. The rate of water movement is moderate in the surface layer and subsoil

Figure 4.—Apartment or townhouse complexes are common in areas of the Urban land-Charlton-Chatfield general soil map unit.

and slow or very slow in the substratum. The depth to bedrock is more than 60 inches.

The moderately well drained Woodbridge soils are nearly level to strongly sloping. They are on low, broad hilltops and the lower part of hillsides. The surface layer is medium textured, and the subsoil and substratum are medium textured and moderately coarse textured. The rate of water movement is moderate in the surface layer and subsoil and slow or very slow in the substratum. The depth to bedrock is more than 60 inches.

Of minor extent in this unit are the very deep Udorthents and the very deep Ridgebury and Sun soils. Udorthents are excessively drained to somewhat poorly drained. They have been disturbed or altered, usually by cutting or filling. They occur throughout the unit. Ridgebury soils are somewhat poorly drained and poorly drained. They are on the lower part of hillsides and along drainageways. Sun soils are poorly drained

and very poorly drained. They are along small drainageways and in depressions.

The slope, the seasonal wetness, and the slow rate of water movement in the substratum are limitations affecting community development. The seasonal wetness and the slope also are limitations affecting recreational development.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under the heading "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Charlton loam, 2 to 8 percent slopes, is a phase of the Charlton series.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more soils, or one or more soils and a miscellaneous area, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Chatfield-Hollis-Rock outcrop complex, hilly, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in the mapped areas are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Palms and Carlisle soils, ponded, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits, quarry, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 3 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The "Glossary" defines many of the terms used in describing the soils.

Soil Descriptions

Ce—Carlisle muck. This soil is nearly level, very deep, and very poorly drained. It formed in well decomposed organic material more than 51 inches thick. It occurs in broad, basinlike or other depressional areas between hills and on outwash or till plains. Individual areas are commonly oval and range from 2 to 200 acres in size. Slopes are less than 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 4 inches, dark reddish brown muck

Subsurface layer:
4 to 52 inches, black muck that has some woody fragments

Bottom layer:
52 to 60 inches, dark reddish brown muck

Included with this soil in mapping are small areas of the very poorly drained Palms and Sun soils. These soils commonly occur around the perimeter of the unit. Palms soils are underlain by loamy material within a depth of 51 inches. Sun soils formed entirely in mineral material. Also included, in areas where fast-flowing streams enter the map unit, are Fluvaquents and Udifluvents. Included areas make up about 20 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: 6 inches above to 12 inches below the surface from September through June
Permeability: Moderately slow to moderately rapid (0.2-6.0 in/hr) throughout the profile
Available water capacity: High
Reaction: Moderately acid to neutral throughout the profile
Surface runoff: Very slow or ponded
Erosion hazard: Highly susceptible to wind erosion

Most areas are wooded or are covered by brushy or herbaceous, water-tolerant plants. Some areas are in parks, and other areas have been partly filled for community development (fig. 5).

The main limitations on sites for dwellings with basements are the seasonal high water table, the ponding, and low strength. Extensive alterations are necessary to overcome these limitations. Better suited soils are in nearby areas.

The ponding and slow percolation are limitations on sites for septic tank absorption fields. Extensive alterations are necessary to overcome these limitations. Better suited soils are in nearby areas.

The main limitations on sites for local roads and streets are the ponding, frost action, and the low strength. Coarse grained base material and an adequate drainage system are necessary to overcome these limitations. Roads should be routed around areas of this soil if possible.

This soil is not suited to cultivated crops, hay, or pasture because of the seasonal high water table and the ponding.

The potential productivity of this soil for red maple is moderate. The use of planting and harvesting equipment is limited by the ponding and the organic soil material. The seedling mortality rate is high because of the wetness. The seasonal high water table restricts root growth and thus increases the windthrow hazard.

The capability subclass is Vw.

ChB—Charlton loam, 2 to 8 percent slopes. This soil is gently sloping, very deep, and well drained. It is on hilltops and parts of hillsides. It formed in glacial till derived from granite, schist, and gneiss. Individual areas are irregular in shape and range from 3 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam that has thin lenses of loamy sand

Included with this soil in mapping are small areas of the well drained Paxton soils, the somewhat excessively drained and well drained Chatfield soils, and the moderately well drained Sutton soils. Paxton soils have a firm, dense substratum. They are in scattered areas throughout the map unit. Chatfield soils are moderately deep over bedrock. They are adjacent to areas of rock outcrop, which are mainly at the summits of hills and ridges. Sutton soils are in swales and shallow drainageways. Also included are areas of Riverhead and Knickerbocker soils on terraces adjacent to large perennial streams; areas of Charlton soils that have a stony, very stony, or bouldery surface; and areas of rock outcrop. Riverhead and Knickerbocker soils are more sandy than the Charlton soil. Included areas make up about 15 to 25 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Slight
Depth to bedrock: More than 60 inches

Many areas of this soil are used for community development or for recreation. Other areas are wooded,

Figure 5.—Areas of Carlisle muck that are drained can be used for recreational purposes, such as golf courses.

are covered by brush, or are used for farming.

No major limitations affect the use of this soil as a site for dwellings with basements, for septic tank absorption fields, or for local roads and streets. During construction, minimizing the removal of vegetation, mulching, and quickly establishing a plant cover help to control erosion and sedimentation.

This soil is well suited to cultivated crops. Erosion is

a hazard, particularly on long slopes or in areas without a plant cover. Contour farming, stripcropping, and minimum tillage can help to control erosion. Returning crop residue to the soil and regularly adding other organic material can maintain or improve soil tilth.

This soil is very well suited to pasture and hay. Overgrazing is the main management concern. It decreases the extent of desirable pasture plants. Rotation grazing and proper stocking rates increase the quantity and quality of feed and forage.

The potential productivity of this soil for northern red oak is moderate. Planting seedlings early in the spring reduces the effects of summer droughtiness, which increases the seedling mortality rate. Establishing logging trails across the slope reduces the hazard of erosion.

Few limitations affect most kinds of recreational development. The slope and small stones are limitations on sites for playgrounds. Land shaping and grading help to overcome the slope. Sandy fill material can be added to cover the small stones. Playgrounds and golf fairways are susceptible to deterioration as a result of midsummer droughtiness. Irrigation reduces droughtiness during these periods.

The capability subclass is IIe.

ChC—Charlton loam, 8 to 15 percent slopes. This soil is strongly sloping, very deep, and well drained. It is on hillsides. It formed in glacial till derived from granite, schist, and gneiss. Individual areas are irregular in shape and range from 3 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam that has thin lenses of loamy sand

Included with this soil in mapping are small areas of the well drained Paxton soils, the somewhat excessively drained and well drained Chatfield soils, and the moderately well drained Sutton soils. Paxton soils have a firm, dense substratum. They are in scattered areas throughout the map unit. Chatfield soils are moderately deep over bedrock. They are adjacent to areas of rock outcrop, which are mainly at the summits of hills and ridges. Sutton soils are in swales and shallow drainageways. Also included are areas of Riverhead and Knickerbocker soils on terraces adjacent to large perennial streams; areas of Charlton soils that have a stony, very stony, or bouldery surface; and areas of rock outcrop. Riverhead and Knickerbocker soils are more sandy than the Charlton soil. Included areas make up about 15 to 20 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: More than 60 inches

Many areas of this soil are used for community development or for recreation. Other areas are wooded, are covered by brush, or are used for farming.

The slope is the main limitation on sites for dwellings with basements. Land shaping and grading or designing the dwellings so that they conform to the natural slope of the land can help to overcome this limitation. Erosion is a hazard during construction. Minimizing the removal of vegetation, using temporary erosion-control structures, and quickly establishing a plant cover help to control erosion and sedimentation.

The slope is the main limitation on sites for septic tank absorption fields. Installing distribution lines on the contour and using distribution boxes or other structures to promote even distribution of effluent increase the efficiency of septic tank absorption fields.

The slope is the main limitation on sites for local roads and streets. Land shaping and grading or adapting road design to the natural slope of the land can help to overcome this limitation.

This soil is moderately suited to cultivated crops. Erosion is a moderate hazard, particularly on long slopes or in areas without a plant cover. Contour farming, stripcropping, and a system of crop rotation that includes several years of sod crops can help to control erosion. Returning crop residue to the soil and regularly adding other organic material can maintain or improve soil tilth.

This soil is well suited to pasture and hay. Overgrazing is the main management concern. It decreases the extent of desirable pasture plants and accelerates erosion. Rotation grazing, applications of fertilizer, weed control, and proper stocking rates

increase the quantity and quality of feed and forage.

The potential productivity of this soil for northern red oak is moderate. Planting seedlings early in the spring reduces the effects of summer droughtiness, which increases the seedling mortality rate. Establishing logging trails across the slope reduces the hazard of erosion.

Few limitations affect most kinds of recreational development. The slope and small stones are limitations on sites for playgrounds. Land shaping and grading help to overcome the slope, or the playgrounds can be constructed in the less sloping included areas. Sandy fill material can be added to cover the small stones. Playgrounds and golf fairways are susceptible to deterioration as a result of midsummer droughtiness. Irrigation reduces droughtiness during these periods.

The capability subclass is IIIe.

ChD—Charlton loam, 15 to 25 percent slopes. This soil is moderately steep, very deep, and well drained. It is on hillsides. It formed in glacial till derived from granite, schist, and gneiss. Individual areas are irregular in shape and range from 3 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam that has thin lenses of loamy sand

Included with this soil in mapping are small areas of the well drained Paxton soils, the somewhat excessively drained and well drained Chatfield and Hollis soils, and the moderately well drained Sutton soils. Paxton soils have a firm, dense substratum. They are in scattered areas throughout the map unit. Chatfield soils are moderately deep over bedrock. Hollis soils are shallow over bedrock. Chatfield and Hollis soils are adjacent to areas of rock outcrop, which are mainly at the summits of hills and ridges. Sutton soils are in swales and shallow drainageways. Also included are areas of Riverhead and Knickerbocker soils on terraces adjacent to large perennial streams; areas of Charlton soils that have a stony, very stony, or bouldery surface; and areas of rock outcrop. Riverhead and Knickerbocker soils are more sandy than the Charlton soil. Included areas make up about 15 to 25 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Erosion hazard: Severe
Depth to bedrock: More than 60 inches

Many areas of this soil are used for recreation. Some areas are used for community development. Other areas are wooded or are covered by brush.

The slope is the main limitation on sites for dwellings with basements. Land shaping and grading or designing the dwellings so that they conform to the natural slope of the land can help to overcome this limitation. If possible, dwellings should be constructed in the less sloping areas. Erosion is a severe hazard during construction. Minimizing the removal of vegetation, using temporary erosion-control structures, and quickly establishing a plant cover help to control erosion and sedimentation.

The slope is the main limitation on sites for septic tank absorption fields. Effluent can seep out along the sides of the hill and cause contamination. The less sloping included areas are better suited to septic tank absorption fields. Installing distribution lines on the contour and using distribution boxes or other structures to promote even distribution of effluent increase the efficiency of the absorption fields.

The slope is the main limitation on sites for local roads and streets. Land shaping and grading or designing the roads so that they conform to the natural slope of the land can help to overcome this limitation.

This soil is poorly suited to cultivated crops. Erosion is a severe hazard, particularly on long slopes or in areas without a plant cover. A system of crop rotation that includes several years of sod crops, contour farming, and conservation tillage during years when cultivated crops are grown can help to control erosion. Returning crop residue to the soil and regularly adding other organic material can maintain or improve soil tilth.

This soil is moderately suited to pasture and hay. Overgrazing is the main management concern. It decreases the extent of desirable pasture plants and accelerates erosion. Rotation grazing, applications of fertilizer, weed control, and proper stocking rates increase the quantity and quality of feed and forage.

The potential productivity of this soil for northern red oak is moderate. The equipment limitation and the hazard of erosion are moderate because of the slope. Planting seedlings early in the spring reduces the effects of summer droughtiness, which increases the seedling mortality rate. Establishing logging trails across the slope reduces the hazard of erosion.

The slope is the main limitation affecting most kinds of recreational development. Small stones also are a limitation. The limitations are most severe in intensively used areas. Land shaping and grading help to overcome the slope, or the recreational facilities can be established in the less sloping included areas. Sandy fill material can be added to cover the small stones. Playgrounds and golf fairways are susceptible to deterioration as a result of midsummer droughtiness. Irrigation reduces droughtiness during these periods.

The capability subclass is IVe.

ChE—Charlton loam, 25 to 35 percent slopes. This soil is steep, very deep, and well drained. It is on hillsides. It formed in glacial till derived from granite, schist, and gneiss. Individual areas are irregular in shape and range from 3 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam that has thin lenses of loamy sand

Included with this soil in mapping are small areas of the well drained Paxton soils, the somewhat excessively drained and well drained Chatfield and Hollis soils, and the moderately well drained Sutton soils. Paxton soils have a firm, dense substratum. They are in scattered areas throughout the map unit. Chatfield soils are moderately deep over bedrock. Hollis soils are shallow over bedrock. Chatfield and Hollis soils are adjacent to areas of rock outcrop, which are mainly at the summits of hills and ridges. Sutton soils are in swales and shallow drainageways. Also included are areas of Riverhead and Knickerbocker soils on terraces adjacent to large perennial streams; areas of Charlton soils that have a stony, very stony, or bouldery surface; and areas of rock outcrop. Riverhead and Knickerbocker soils are more sandy than the Charlton soil. Included areas make up about 15 to 25 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Very rapid
Erosion hazard: Very severe
Depth to bedrock: More than 60 inches

Many areas of this soil are used for recreation. Other areas are wooded or are covered by brush.

The slope is the main limitation on sites for dwellings with basements. Extensive alterations are necessary to overcome this limitation. The less sloping included areas and the nearby soils have fewer limitations affecting dwellings.

The slope is the main limitation on sites for septic tank absorption fields. Effluent can seep out along the sides of the hill and cause contamination. Extensive alterations are necessary to overcome these limitations. The less sloping included areas and nearby soils are better suited to septic tank absorption fields.

The slope is the main limitation on sites for local roads and streets. Land shaping and grading or designing the roads so that they conform to the natural slope of the land can help to overcome this limitation.

This soil is not suited to cultivated crops because of the very severe hazard of erosion and the slope. It is only poorly suited to permanent pasture. Overgrazing is the main management concern. It decreases the extent of desirable pasture plants and accelerates erosion. Rotation grazing, applications of fertilizer, weed control, and proper stocking rates increase the quantity and quality of feed and forage.

The potential productivity of this soil for northern red oak is moderate. The equipment limitation and the hazard of erosion are moderate because of the slope. Planting seedlings early in the spring reduces the effects of summer droughtiness, which increases the seedling mortality rate. Establishing logging trails across the slope reduces the hazard of erosion.

The slope is the main limitation affecting most kinds of recreational development. Small stones also are a limitation. The limitations are most severe in intensively used areas. Extensive alterations are necessary to overcome these limitations. Sandy fill material can be added to cover the small stones. The less sloping

included areas and the nearby soils are better suited to recreational development.

The capability subclass is VIe.

ClB—Charlton loam, 2 to 8 percent slopes, very stony. This soil is gently sloping, very deep, and well drained. It is on hilltops and parts of hillsides. It formed in glacial till derived from granite, schist, and gneiss. Stones cover 0.1 to 3.0 percent of the surface and are about 3 to 25 feet apart. Individual areas are irregular in shape and range from 3 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam that has thin lenses of loamy sand

Included with this soil in mapping are small areas of the well drained Paxton soils, the somewhat excessively drained and well drained Chatfield soils, and the moderately well drained Sutton soils. Paxton soils have a firm, dense substratum. They occur as scattered areas throughout the map unit. Chatfield soils are moderately deep over bedrock. They are adjacent to areas of rock outcrop, which are mainly at the summits of hills and ridges. Sutton soils are in swales and shallow drainageways. Also included are areas of Riverhead and Knickerbocker soils on terraces adjacent to large perennial streams, areas of Charlton soils that have an extremely stony or bouldery surface, and areas of rock outcrop. Riverhead and Knickerbocker soils are more sandy than the Charlton soil. The included Charlton soils are commonly in the western part of Putnam County. Included areas make up about 15 to 25 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Slight
Depth to bedrock: More than 60 inches

Many areas are wooded. Other areas are used for community development or for recreation. A few areas have been cleared and are used for farming.

No major limitations affect the use of this soil as a site for dwellings with basements, for septic tank absorption fields, or for local roads and streets. During construction, minimizing the removal of vegetation, mulching, and quickly establishing a plant cover help to control erosion and sedimentation.

This soil is not suited to cultivated crops because of stoniness. It is only poorly suited to permanent pasture because of the stoniness. Maintaining an adequate cover of sod is the main management concern. Overgrazing also is a concern. It decreases the extent of desirable pasture plants. Rotation grazing, applications of fertilizer, weed and brush control, and proper stocking rates increase the quantity and quality of feed and forage.

The potential productivity of this soil for northern red oak is moderate. Planting seedlings early in the spring reduces the effects of summer droughtiness, which increases the seedling mortality rate. Establishing logging trails across the slope reduces the hazard of erosion.

Surface stoniness is the main limitation on sites for recreational development. The slope also is a limitation on sites for playgrounds. Land shaping and grading help to overcome the slope. Removing the stones may be necessary in intensively used areas. Recreational areas are susceptible to deterioration as a result of midsummer droughtiness. Irrigation reduces droughtiness during these periods.

The capability subclass is VIs.

ClC—Charlton loam, 8 to 15 percent slopes, very stony. This soil is strongly sloping, very deep, and well drained. It is on hilltops and parts of hillsides. It formed in glacial till derived from granite, schist, and gneiss. Stones cover 0.1 to 3.0 percent of the surface and are about 3 to 25 feet apart. Individual areas are irregular in shape and range from 3 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam that has thin lenses of loamy sand

Included with this soil in mapping are small areas of the well drained Paxton soils, the somewhat excessively drained and well drained Chatfield soils, and the moderately well drained Sutton soils. Paxton soils have a firm, dense substratum. They are in scattered areas throughout the map unit. Chatfield soils are moderately deep over bedrock. They are adjacent to areas of rock outcrop, which are mainly at the summits of hills and ridges. Sutton soils are in swales and shallow drainageways. Also included are areas of Riverhead and Knickerbocker soils on terraces adjacent to large perennial streams; areas of Charlton soils that have an extremely stony or bouldery surface; and areas of rock outcrop. Riverhead and Knickerbocker soils are more sandy than the Charlton soil. The included Charlton soils are commonly in the western part of Putnam County. Included areas make up about 15 to 25 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: More than 60 inches

Many areas are wooded. Other areas are used for community development or for recreation. A few areas have been cleared and are used for farming.

The slope is the main limitation on sites for dwellings with basements. Surface stones also are a concern. Land shaping and grading or designing the dwellings so that they conform to the natural slope of the land can help to overcome these limitations. Removing the stones facilitates excavation. Erosion is a hazard during construction. Minimizing the removal of vegetation, using temporary erosion-control structures, and quickly establishing a plant cover help to control erosion and sedimentation.

The slope is the main limitation on sites for septic tank absorption fields. Surface stones interfere with the trenching for distribution lines. Installing the distribution lines on the contour and using distribution boxes or other structures to promote even distribution of effluent increase the efficiency of septic tank absorption fields.

The slope is the main limitation on sites for local roads and streets. Land shaping and grading or designing the roads so that they conform to the natural slope of the land can help to overcome this limitation.

This soil is not suited to cultivated crops because of the stoniness. It is only poorly suited to permanent pasture because of the stoniness. Maintaining an adequate cover of sod is the main management concern. Overgrazing also is a concern. It decreases the extent of desirable pasture plants. Rotation grazing, applications of fertilizer, weed and brush control, and proper stocking rates increase the quantity and quality of feed and forage.

The potential productivity of this soil for northern red oak is moderate. Planting seedlings early in the spring reduces the effects of summer droughtiness, which increases the seedling mortality rate. Establishing logging trails across the slope reduces the hazard of erosion.

Surface stoniness is the main limitation affecting recreational development. The slope also is a limitation on sites for playgrounds. Land shaping and grading help to overcome these limitations. Removing the stones may be necessary in intensively used areas. Recreational areas are susceptible to deterioration as a result of midsummer droughtiness. Irrigation reduces droughtiness during these periods.

The capability subclass is VIs.

ClD—Charlton loam, 15 to 25 percent slopes, very stony. This soil is moderately steep, very deep, and well drained. It is on hillsides. It formed in glacial till derived from granite, schist, and gneiss. Stones cover 0.1 to 3.0 percent of the surface and are about 3 to 25 feet apart. Individual areas are irregular in shape and range from 3 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam that has thin lenses of loamy sand

Included with this soil in mapping are small areas of the well drained Paxton soils, the somewhat excessively drained and well drained Chatfield soils, and the moderately well drained Sutton soils. Paxton soils have a firm, dense substratum. They are in scattered areas throughout the map unit. Chatfield soils are moderately

deep over bedrock. They are adjacent to areas of rock outcrop, which are mainly at the summits of hills and ridges. Sutton soils are in swales and shallow drainageways. Also included are areas of Riverhead and Knickerbocker soils on terraces adjacent to large perennial streams, areas of Charlton soils that have an extremely stony or bouldery surface, and areas of rock outcrop. Riverhead and Knickerbocker soils are more sandy than the Charlton soil. The included Charlton soils are commonly in the western part of Putnam County. Included areas make up about 15 to 25 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Erosion hazard: Severe
Depth to bedrock: More than 60 inches

Many areas are wooded. Other areas are used for community development or for recreation. A few areas have been cleared and are used for farming.

The slope is the main limitation on sites for dwellings with basements. Surface stones also are a concern. Land shaping and grading or designing the dwellings so that they conform to the natural slope of the land can help to overcome these limitations. Removing the stones facilitates excavation. Erosion is a severe hazard during construction. Minimizing the removal of vegetation, using temporary erosion-control structures, and quickly establishing a plant cover help to control erosion and sedimentation.

The slope is the main limitation on sites for septic tank absorption fields. Surface stones interfere with the trenching for distribution lines and structures. Installing the distribution lines on the contour and using distribution boxes or other structures to promote even distribution of effluent increase the efficiency of septic tank absorption fields.

The slope is the main limitation on sites for local roads and streets. Land shaping and grading or designing the roads so that they conform to the natural slope of the land can help to overcome this limitation.

This soil is not suited to cultivated crops because of the stoniness. It is only poorly suited to permanent pasture because of the stoniness and the slope. Maintaining an adequate cover of vegetation is the main management concern. Overgrazing also is a concern. It decreases the extent of desirable pasture plants and accelerates erosion. Rotation grazing, applications of fertilizer, weed and brush control, and proper stocking rates increase the quantity and quality of feed and forage.

The potential productivity of this soil for northern red oak is moderate. The equipment limitation and the hazard of erosion are moderate because of the slope. Planting seedlings early in the spring reduces the effects of summer droughtiness, which increases the seedling mortality rate. Establishing logging trails across the slope reduces the hazard of erosion.

The slope and the surface stones are the main limitations affecting recreational development. Land shaping and grading help to overcome the slope, or intensively used areas can be limited to the less sloping included areas. Removing the stones may be necessary in intensively used areas. Recreational areas are susceptible to deterioration as a result of midsummer droughtiness. Irrigation reduces droughtiness during these periods.

The capability subclass is VIs.

ClE—Charlton loam, 25 to 35 percent slopes, very stony. This soil is steep, very deep, and well drained. It is on hillsides and valley sides. It formed in glacial till derived from granite, schist, and gneiss. Stones cover 0.1 to 3.0 percent of the surface and are about 3 to 25 feet apart. Individual areas are irregular in shape and range from 3 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam that has thin lenses of loamy sand

Included with this soil in mapping are small areas of the well drained Paxton soils, the somewhat excessively drained and well drained Chatfield and Hollis soils, and the moderately well drained Sutton soils. Paxton soils have a firm, dense substratum. They are in scattered areas throughout the map unit. Chatfield soils are moderately deep over bedrock. Hollis soils are shallow over bedrock. Chatfield and Hollis soils are adjacent to areas of rock outcrop, which are mainly at the summits of hills and ridges. Sutton soils are in swales and shallow drainageways. Also included are areas of

Riverhead and Knickerbocker soils on terraces adjacent to large perennial streams, areas of Charlton soils that have an extremely stony or bouldery surface, and areas of rock outcrop. Riverhead and Knickerbocker soils are more sandy than the Charlton soil. The included Charlton soils are commonly in the western part of Putnam County. Included areas make up about 15 to 25 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Very rapid
Erosion hazard: Very severe
Depth to bedrock: More than 60 inches

Most areas are wooded. Some areas are used for community development or for recreation.

The slope is the main limitation on sites for dwellings with basements. Surface stones also are a concern. Extensive alterations are necessary to overcome these limitations. Included areas and the nearby soils that are less sloping and that contain fewer surface stones are better suited as sites for dwellings.

The slope is the main limitation on sites for septic tank absorption fields. The surface stones interfere with the trenching for distribution lines and structures. Extensive alterations are necessary to overcome these limitations. Included areas and the nearby soils that are less sloping and that contain fewer surface stones are better suited to septic tank absorption fields.

The slope is the main limitation on sites for local roads and streets. Land shaping and grading or designing the roads so that they conform to the natural slope of the land can help to overcome this limitation.

This soil is not suited to cultivated crops or pasture because of the stoniness and the slope.

The potential productivity of this soil for northern red oak is moderate. The equipment limitation and the hazard of erosion are moderate because of the slope. Planting seedlings early in the spring reduces the effects of summer droughtiness, which increases the seedling mortality rate. Establishing logging trails across the slope reduces the hazard of erosion.

The slope and the surface stones are the main limitations affecting recreational development. Extensive alterations are necessary to overcome these limitations. Included areas and the nearby soils that are less sloping and that contain fewer stones are better suited to recreational development.

The capability subclass is VIIs.

ClF—Charlton loam, 35 to 45 percent slopes, very stony. This soil is very steep, very deep, and well drained. It is on hillsides and valley sides. It formed in glacial till derived from granite, schist, and gneiss. Stones cover 0.1 to 3.0 percent of the surface and are about 3 to 25 feet apart. Individual areas are irregular in shape and range from 3 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam that has thin lenses of loamy sand

Included with this soil in mapping are small areas of the well drained Paxton soils, the somewhat excessively drained and well drained Chatfield and Hollis soils, and the moderately well drained Sutton soils. Paxton soils have a firm, dense substratum. They are in scattered areas throughout the map unit. Chatfield soils are moderately deep over bedrock. Hollis soils are shallow over bedrock. Chatfield and Hollis soils are adjacent to areas of rock outcrop, which are mainly at the summits of hills and ridges. Sutton soils are in swales and shallow drainageways. Also included are areas of Riverhead and Knickerbocker soils on terraces adjacent to large perennial streams, areas of Charlton soils that have an extremely stony or bouldery surface, and areas of rock outcrop. Riverhead and Knickerbocker soils are more sandy than the Charlton soil. The included Charlton soils are commonly in the western part of Putnam County. Included areas make up about 15 to 25 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Very rapid

Erosion hazard: Very severe
Depth to bedrock: More than 60 inches

Most areas are wooded.

The slope is the main limitation on sites for dwellings with basements. Surface stones also are a concern. Extensive alterations are necessary to overcome these limitations. Included areas and the nearby soils that are less sloping and that contain fewer surface stones are better suited to dwellings.

The slope is the main limitation on sites for septic tank absorption fields. The surface stones interfere with the trenching for distribution lines and structures. Extensive alterations are necessary to overcome these limitations. Included areas and the nearby soils that are less sloping and that contain fewer surface stones are better suited to septic tank absorption fields.

The slope is the main limitation on sites for local roads and streets. Land shaping and grading or designing the roads so that they conform to the natural slope of the land can help to overcome this limitation.

This soil is not suited to cultivated crops or pasture because of the stoniness and the slope.

The potential productivity of this soil for northern red oak is moderate. The equipment limitation and the hazard of erosion are severe because of the slope. Planting seedlings early in the spring reduces the effects of summer droughtiness, which increases the seedling mortality rate. Establishing logging trails across the slope reduces the hazard of erosion.

The slope and the surface stones are the main limitations affecting recreational development. Extensive alterations are necessary to overcome these limitations. Included areas and the nearby soils that are less sloping and that contain fewer stones are better suited to recreational development.

The capability subclass is VIIs.

CrC—Charlton-Chatfield complex, rolling, very rocky. This unit consists of the very deep and moderately deep, well drained and somewhat excessively drained Chatfield soil and the well drained Charlton soil. It is on hilltops and hillsides that are underlain by highly folded bedrock. Slopes range from 2 to 15 percent. Individual areas are highly irregular in shape and range from 3 to 100 acres in size. They are about 50 percent Charlton soil, 30 percent Chatfield soil, and 20 percent other soils and rock outcrop. The rock outcrop covers 2 to 10 percent of the surface.

The typical sequence, depth, and composition of the layers of the Charlton soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam that has thin lenses of loamy sand

The typical sequence, depth, and composition of the layers of the Chatfield soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 7 inches, dark brown loam

Subsoil:
7 to 24 inches, brown flaggy silt loam

Bedrock:
24 inches, fractured granitic bedrock

Included in mapping are areas of the moderately well drained Sutton soils, the somewhat poorly drained and poorly drained Leicester soils, and the poorly drained and very poorly drained Sun soils. Sutton soils are along drainageways and in concave interridge areas. Leicester and Sun soils are in shallow depressions and along drainageways. Also included are the poorly drained Carlisle and Palms soils, the somewhat excessively drained and well drained Hollis soils, and areas of soils that are similar to the Chatfield soil but are deep over bedrock. Carlisle and Palms soils are in closed depressions. Hollis soils are shallow over bedrock. They are in scattered areas throughout the unit but are mostly on ridgetops. The soils that are similar to the Chatfield soil are in the western part of Putnam County, in areas where the surface is extremely stony or bouldery. Included areas make up about 25 percent of the map unit and range to about 2 acres in size.

Properties of the Charlton soil—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: More than 60 inches

Properties of the Chatfield soil—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Low
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: 20 to 40 inches

Most areas of this unit in Putnam County are wooded. In Westchester County, many areas are used for community development. Other areas are wooded or are used for pasture.

The major limitation on sites for dwellings with basements is the moderate depth to bedrock in areas of the Chatfield soil and the rock outcrop. Also, because of the irregular topography, careful investigation is needed when potential dwelling sites are selected. Where possible, dwellings with basements should be constructed in areas of the very deep Charlton soil. The Chatfield soil is more suited to dwellings without basements than to dwellings with basements. Erosion is a hazard during construction, especially on the steeper slopes. Reestablishing a plant cover as soon as possible after construction and using mulch and siltation basins can help to control erosion.

The moderate depth to bedrock in the Chatfield soil and the rock outcrop are the main limitations on sites for septic tank absorption fields. The Charlton soil is better suited than the Chatfield soil to septic systems; however, the depth to bedrock is variable throughout the unit. The irregular topography is also a concern when sites for absorption fields are selected.

The variable depth to bedrock is the main limitation on sites for local roads and streets. The rock outcrop also hinders land shaping and grading. Blasting or ripping is necessary to remove the rock. Grading and street locations should be planned to avoid the areas of rock outcrop.

These soils are unsuited to cultivated crops because of the exposures of bedrock. The use of machinery is limited because of the uneven slopes. The soils are only poorly suited to permanent pasture. The short, uneven slopes and the areas of exposed bedrock are the main limitations. Both of these limitations interfere with equipment use. Overgrazing is also a management concern. It decreases the extent of desirable pasture plants. Rotation grazing, applications of fertilizer, weed and brush control, and proper stocking rates increase the quantity and quality of feed and forage.

The potential productivity of these soils for northern red oak is moderate. The shallow depth to bedrock in the Chatfield soil and the areas of exposed bedrock restrict the rooting depth of some tree species. Planting early in the spring reduces the effects of summer droughtiness. Establishing logging trails across the slope reduces the hazard of erosion.

The irregular topography, the shallow depth to bedrock, and the rock outcrop are limitations affecting most kinds of recreational development. Some areas are suitable for hiking trails and bridle paths.

The capability subclass is VIs.

CsD—Chatfield-Charlton complex, hilly, very rocky. This unit consists of the very deep and moderately deep, well drained and somewhat excessively drained Chatfield soil and the well drained Charlton soil. It is on the tops and sides of hills that are underlain by highly folded bedrock. Slopes range from 15 to 35 percent. Individual areas are highly irregular in shape and range from 3 to 75 acres in size. They are about 45 percent Chatfield soil, 35 percent Charlton soil, and 20 percent other soils and rock outcrop. The rock outcrop covers 2 to 10 percent of the surface.

The typical sequence, depth, and composition of the layers of the Chatfield soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 7 inches, dark brown loam

Subsoil:
7 to 24 inches, brown flaggy silt loam

Bedrock:
24 inches, fractured granitic bedrock

The typical sequence, depth, and composition of the layers of the Charlton soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam that has thin lenses of loamy sand

Included in mapping are areas of the moderately well drained Sutton soils, the somewhat poorly drained and poorly drained Leicester soils, and the poorly drained and very poorly drained Sun soils. Sutton soils are

along drainageways and in concave interridge areas. Leicester and Sun soils are in shallow depressions and along drainageways. Also included are the very poorly drained Carlisle and Palms soils, the somewhat excessively drained and well drained Hollis soils, and areas of soils that are similar to the Chatfield soil but are deep over bedrock. Carlisle and Palms soils are in closed depressions. Hollis soils are shallow over bedrock. They are in scattered areas throughout the unit but are mostly on ridgetops. The soils that are similar to the Chatfield soil are in the western part of Putnam County, in areas where the surface is extremely stony or bouldery. Included areas range to about 2 acres in size.

Properties of the Charlton soil—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Erosion hazard: Severe
Depth to bedrock: More than 60 inches

Properties of the Chatfield soil—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Low
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Erosion hazard: Severe
Depth to bedrock: 20 to 40 inches

Most areas of this unit in Putnam County are wooded. In Westchester County, many areas are used for community development. Other areas are wooded or are used for pasture.

The major limitation on sites for dwellings with basements is the irregular topography. The moderate depth to bedrock in the Chatfield soil and the areas of rock outcrop also are limitations. Where possible, dwellings with basements should be constructed in areas of the very deep Charlton soil. The Chatfield soil is more suited to dwellings without basements than to dwellings with basements. Erosion is a severe hazard during construction, especially on the steeper slopes. Minimizing the removal of vegetative cover, reestablishing a plant cover as soon as possible after construction, and using mulch and siltation basins can help to control erosion.

The moderate depth to bedrock, the rock outcrop, and the slope are the main limitations in areas of the Chatfield soil used as sites for septic tank absorption fields. The Charlton soil is better suited than the Chatfield soil to septic systems; however, the depth to bedrock is variable throughout the unit. The irregular topography is also a concern when sites for absorption fields are selected.

The slope and the variable depth to bedrock are the main limitations on sites for local roads and streets. The rock outcrop also limits land shaping and grading. Blasting or ripping is necessary to remove the rock. Grading and street locations should be planned to avoid the rock outcrop.

These soils are unsuited to cultivated crops because of the rock outcrop and the uneven topography. The use of machinery is limited because of the slope. The soils are only poorly suited to permanent pasture. The short, uneven slopes and the areas of exposed bedrock are the main limitations. Both of these limitations interfere with equipment use. Overgrazing is also a management concern. It decreases the extent of desirable pasture plants and accelerates erosion. Rotation grazing, applications of fertilizer, weed and brush control, and proper stocking rates increase the quantity and quality of feed and forage.

The potential productivity of these soils for northern red oak is moderate. The shallow depth to bedrock in the Chatfield soil and the rock outcrop restrict the rooting depth of some tree species. Planting early in the spring reduces the effects of summer droughtiness. The slope limits the use of equipment. Establishing logging trails across the slope reduces the hazard of erosion.

The irregular topography, the shallow depth to bedrock, and the rock outcrop are limitations affecting most kinds of recreational uses. Some areas are suitable for hiking trails and bridle paths. Included areas that are less sloping and that have less rock outcrop are better suited to recreational development.

The capability subclass is VIs.

CtC—Chatfield-Hollis-Rock outcrop complex, rolling. This unit consists of the rolling, moderately deep, well drained and somewhat excessively drained Chatfield soil, the shallow, well drained and somewhat excessively drained Hollis soil, and areas of Rock outcrop, dominantly granite, gneiss, and schist. The unit is on hilltops and narrow ridges in bedrock-controlled landscapes. Slopes dominantly range from 3 to 15 percent. Individual areas of this unit are mostly irregular in shape and range from 2 to 100 acres in size. They are typically about 30 percent Chatfield soil, 30 percent

Hollis soil, 20 percent Rock outcrop, and 20 percent other soils.

The typical sequence, depth, and composition of the layers of the Chatfield soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 7 inches, dark brown loam

Subsoil:
7 to 24 inches, brown flaggy silt loam

Bedrock:
24 inches, fractured granitic bedrock

The typical sequence, depth, and composition of the layers of the Hollis soil are as follows—

Surface layer:
0 to 1 inch, dark brown fine sandy loam

Subsoil:
1 to 16 inches, dark yellowish brown fine sandy loam

Bedrock:
16 inches, folded granitic bedrock

Included in mapping are the somewhat poorly drained and poorly drained Leicester soils, the very poorly drained Sun and Palms soils, and the moderately well drained Sutton soils. Leicester soils are in concave areas between ridges and along drainageways. Sun and Palms soils are in closed depressions. Sutton soils also are in concave areas between ridges but are slightly higher on the landscape than the Leicester soils. Also included are areas of the very deep and well drained Charlton soils, areas of soils that are very shallow over bedrock, and areas of soils that have stones and boulders at the surface. Charlton soils are in scattered areas throughout the unit. The very shallow soils are adjacent to areas of Rock outcrop. The stony and bouldery soils are mainly on the lower part of slopes. Included areas range to about 2 acres in size.

Properties of the Chatfield soil—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Low
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: 20 to 40 inches

Properties of the Hollis soil—

Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Very low
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: 10 to 20 inches

Most areas are wooded or covered by brush. A few areas are used for pasture. Some scattered areas are used for community development.

The main limitation on sites for dwellings with basements is the shallow depth to bedrock. The irregular topography also is a limitation. Fewer limitations affect dwellings without basements than dwellings with basements. The dwellings can be built above the bedrock and landscaped with additional fill. Erosion is a hazard during construction. Quickly establishing a plant cover, mulching, and using siltation basins or other temporary structures can help to control erosion and sedimentation during construction.

The main limitation on sites for septic tank absorption fields is the shallow depth to bedrock. The irregular topography also is a limitation affecting the design of septic systems. The soils are not deep enough over bedrock to adequately filter the effluent. More suitable sites are available in areas of included or nearby soils.

The main limitation on sites for local roads and streets is the shallow depth to bedrock. Grading and road locations should be planned to avoid the areas of Rock outcrop.

This unit is not suited to cultivated crops because of the shallow depth to bedrock, the irregular topography, and the Rock outcrop. It is only poorly suited to permanent pasture. The low available water capacity results in droughtiness and slow plant growth. Overgrazing is also a management concern. Restricted use during dry periods, pasture rotation, applications of fertilizer, and weed and brush control can increase forage yields.

The potential productivity of this unit for northern red oak is moderate. In areas of the Hollis soil, droughtiness limits tree growth. The shallow depth to bedrock restricts rooting depth and increases the windthrow hazard.

The shallow depth to bedrock, the uneven topography, and the Rock outcrop are the main limitations affecting recreational development. The unit is suited to paths and hiking trails.

The capability subclass is VIs.

CuD—Chatfield-Hollis-Rock outcrop complex, hilly. This unit consists of the moderately deep, well drained and somewhat excessively drained Chatfield soil, the shallow, well drained and somewhat excessively drained Hollis soil, and areas of Rock outcrop, dominantly granite, schist, and gneiss. The unit is on hillsides in bedrock-controlled landscapes. Slopes are dominantly 15 to 35 percent. Very steep or nearly vertical bedrock escarpments are common landscape features. Individual areas of this unit are mostly long and narrow and range from 2 to 200 acres in size. They are typically about 30 percent Chatfield soil, 30 percent Hollis soil, 25 percent Rock outcrop, and 15 percent other soils.

The typical sequence, depth, and composition of the layers of the Chatfield soil are as follows

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 7 inches, dark brown loam

Subsoil:
7 to 24 inches, brown flaggy silt loam

Bedrock:
24 inches, fractured granitic bedrock

The typical sequence, depth, and composition of the layers of the Hollis soil are as follows—

Surface layer:
0 to 1 inch, dark brown fine sandy loam

Subsoil:
1 to 16 inches, dark yellowish brown fine sandy loam

Bedrock:
16 inches, folded granitic bedrock

Included with this unit in mapping are the somewhat poorly drained and poorly drained Leicester soils, the very poorly drained Sun and Palms soils, and the moderately well drained Sutton soils. Leicester soils are in concave areas between ridges and along drainageways. Sun and Palms soils are in closed depressions. Sutton soils also are in concave areas between ridges but are slightly higher on the landscape than the Leicester soils. Also included are areas of the very deep and well drained Charlton soils, areas of soils that are very shallow over bedrock, and areas of soils that have stones and boulders at the surface. Charlton soils are in scattered areas throughout the unit. The very shallow soils are immediately adjacent to areas of Rock outcrop. The stony and bouldery soils are mainly on the lower part of the slopes. Included areas are as much as 2 acres in size.

Properties of the Chatfield soil—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Low
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Erosion hazard: Severe
Depth to bedrock: 20 to 40 inches

Properties of the Hollis soil—

Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Very low
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Erosion hazard: Severe
Depth to bedrock: 10 to 20 inches

Most areas of this unit are wooded or covered by brush. A few areas are used for pasture (fig. 6). Some scattered areas are used for community development.

The main limitations on sites for dwellings with basements are the shallow depth to bedrock and the irregular topography. Extensive alterations are necessary to overcome these limitations. Included areas and the less sloping nearby soils that are deeper over bedrock are better suited to dwellings.

The main limitations on sites for septic tank absorption fields are the shallow depth to bedrock and the irregular topography. The soils are not deep enough over bedrock to adequately filter the effluent. More suitable sites are nearby.

The main limitations on sites for local roads and streets are the shallow depth to bedrock and the irregular topography. Grading and road locations should be planned to avoid the areas of Rock outcrop.

This unit is not suited to cultivated crops or pasture because of the shallow depth to bedrock, the irregular topography, and the Rock outcrop.

The potential productivity of this unit for northern red oak is moderate. In areas of the Hollis soil, droughtiness limits tree growth. The shallow depth to bedrock limits the growth of roots and increases the windthrow hazard. The irregular topography limits the use of equipment.

The shallow depth to bedrock, the irregular topography, and the Rock outcrop are the main limitations affecting recreational development. The unit is suited to paths and hiking trails.

The capability subclass is VIIs.

Figure 6.—A small horse farm in an area of Chatfield-Hollis-Rock outcrop complex, hilly. The sloping Chatfield soil is in the background, and the included Leicester soils are in the foreground.

Ff—Fluvaquents-Udifluvents complex, frequently flooded. This unit consists of very deep, well drained to very poorly drained, nearly level soils that formed in recent alluvial deposits. The soils are frequently flooded, which results in stream scouring, lateral erosion, and shifting of the soil from place to place. Soil characteristics, including texture, content of gravel, and drainage class, are so variable within short distances that mapping at the series level was not practical. Slopes range from 0 to 3 percent. Individual areas are mostly long and narrow and are adjacent to streams. They commonly range from 5 to 50 acres in size. A few wider areas are along the larger streams and rivers. The areas are about 50 percent Fluvaquents, 35 percent Udifluvents, and 15 percent other soils.

The range in sequence, depth, and composition of the layers of the Fluvaquents is as follows—

Surface layer:

0 to 8 inches, dark brown to dark gray very gravelly sand to silty clay loam

Substratum:

8 to 60 inches, mottled gray to dark brown coarse sandy loam to silty clay loam

The range in sequence, depth, and composition of the layers of the Udifluvents is as follows—

Surface layer:

0 to 12 inches, brown to gray very gravelly sand to silty clay loam

Substratum:

12 to 60 inches, brown and yellowish brown to olive brown coarse sandy loam to silty clay loam

Included in mapping are a few small areas of the somewhat poorly drained and poorly drained Ridgebury and Leicester soils and the poorly drained Sun soils. Sun soils formed in glacial till in the uplands. Also included are the somewhat excessively drained Knickerbocker soils, the excessively drained Hinckley soils, the well drained Riverhead soils, the very poorly drained Carlisle and Palms soils, and areas that have gravel and stones at the surface. Riverhead soils formed in glacial outwash along the major stream valleys. Carlisle and Palms soils formed in organic deposits in depressions. Included areas range from 0.25 acre to 2.0 acres in size.

Soil properties of the Fluvaquents—

Water table: 1.0 foot above to 1.5 feet below the surface from October through June
Flooding: Frequent for brief periods from November through June
Surface runoff: Very slow or ponded
Erosion hazard: Slight; subject to water scouring and deposition during flooding
Reaction: Very strongly acid to mildly alkaline throughout the profile
Depth to bedrock: More than 60 inches

Soil properties of the Udifluvents—

Water table: 1.5 to 3.0 feet below the surface from November through April
Flooding: Frequent for brief periods from November through June
Surface runoff: Slow
Erosion hazard: Slight; subject to water scouring and deposition during flooding
Reaction: Very strongly acid to neutral throughout the profile
Depth to bedrock: More than 60 inches

Most areas of this unit support native grasses, are covered by brush, or are wooded. Some small areas are used as pasture.

This unit is unsuitable as a site for dwellings, local roads and streets, or septic tank absorption fields because of the frequent flooding, the wetness, and the ponding. Extensive alterations are necessary to overcome these limitations. Nearby soils that are better drained and are not subject to flooding are better suited to these uses.

This unit is not suited to cultivated crops because of the frequent flooding and the wetness. Some areas can be used for pasture and hay, but they are only poorly suited to this use.

The capability subclass is Vw.

Fr—Fredon silt loam. This soil is nearly level, very deep, and poorly drained and somewhat poorly drained. It is in slight depressions in benchlike areas along streams and in relatively flat areas underlain by deposits of sand or gravel. It formed in glacial outwash. Individual areas are irregular in shape and range from 2 to 20 acres in size. Slopes range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches, very dark grayish brown silt loam

Subsurface layer:
7 to 10 inches, dark gray silt loam

Subsoil:
10 to 13 inches, grayish brown silt loam that has light yellowish brown mottles
13 to 16 inches, gray fine sandy loam that has strong brown and light yellowish brown mottles
16 to 20 inches, gray fine sandy loam that has yellowish brown mottles
20 to 24 inches, gray loamy sand that has yellowish brown mottles

Substratum:
24 to 60 inches, gray very gravelly loamy sand

Included with this soil in mapping are the moderately well drained Pompton soils in the slightly higher areas. Also included are areas of the somewhat poorly drained and poorly drained Leicester soils, the moderately well drained Sutton soils in areas where glacial till is close to the surface, the very poorly drained Palms soils, and the frequently flooded Fluvaquents and Udifluvents. Palms soils and Fluvaquents and Udifluvents are in some of the large depressions and in areas along streams. Included areas make up about 15 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: 0.5 foot to 1.5 feet below the surface from October through June
Permeability: Moderately slow or moderate (0.2-2.0 in/hr) in the surface layer and subsoil and rapid (6.0-20 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Moderately acid to neutral in the surface layer and subsoil and slightly acid to moderately alkaline in the substratum
Surface runoff: Slow
Erosion hazard: Slight
Depth to bedrock: More than 60 inches

Most areas are wooded or support brushy plants.

The main limitation on sites for dwellings with

basements is the seasonal high water table. Building the dwellings in the highest areas of the unit, installing drains around footings, and diverting runoff from the higher areas can help to overcome this limitation. The soil is more suited to dwellings without basements than to dwellings with basements.

The main limitations on sites for septic tank absorption fields are the seasonal high water table and the rapid permeability in the substratum, which results in a poor filtering capacity. Ground-water contamination is a hazard. Better suited sites should be selected for this use.

The main limitations on sites for local roads and streets are the seasonal high water table and the potential for frost action. Providing an adequate drainage system and using a coarse grained base material during road construction help to overcome these limitations.

This soil is moderately suited to cultivated crops. Wetness is the main limitation. It is a particular concern during planting and harvesting. A subsurface drainage system reduces wetness, promotes crop growth, and facilitates the use of farm equipment.

This soil is well suited to pasture and hay. Wetness is a limitation. Grazing should be restricted during periods in early spring and late fall when the soil is likely to be saturated with water. Overgrazing causes soil compaction and deterioration of the sod. Rotation grazing, using proper stocking rates, and selecting plants that are tolerant of wetness can improve forage yields.

The potential productivity of this soil for red maple is moderate. The windthrow hazard, the equipment limitation, and seedling mortality are severe because of the wetness.

Wetness is the main limitation affecting recreational development. Grading and land shaping can remove surface water by diverting runoff from the higher areas. A subsurface drainage system lowers the water table.

The capability subclass is IIIw.

HnB—Hinckley gravelly loamy sand, 3 to 8 percent slopes. This gently sloping soil is very deep and excessively drained. It is on terraces along valley sides or in gently rolling areas in the lowlands. Individual areas are long and narrow and range from 5 to about 35 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, very dark grayish brown gravelly loamy sand

Subsurface layer:
3 to 7 inches, dark brown gravelly loamy sand

Subsoil:
7 to 17 inches, dark yellowish brown very gravelly loamy sand

Substratum:
17 to 31 inches, light olive brown very gravelly sand
31 to 44 inches, light olive brown very gravelly coarse sand
44 to 49 inches, brown coarse sand
49 to 60 inches, brown very gravelly coarse sand

Included with this soil in mapping are areas of the moderately well drained and somewhat poorly drained Pompton soils. Pompton soils are slightly lower on the landscape than the Hinckley soil. Also included are small areas of Knickerbocker and Riverhead soils. Knickerbocker and Riverhead soils are less gravelly than the Hinckley soil. Included areas make up about 15 percent of the map unit and are 0.25 acre to 2.0 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Rapid (6.0-20 in/hr) in the surface layer and subsoil and very rapid (>20 in/hr) in the substratum
Available water capacity: Very low
Reaction: Extremely acid to moderately acid throughout the profile
Surface runoff: Slow
Erosion hazard: Slight
Depth to bedrock: More than 60 inches

Many areas of this soil are used for community development. Large areas have been mined for sand and gravel. A few areas are covered by brush, are wooded, or are used for pasture and hay.

No major limitations affect the use of this soil as a site for dwellings with basements, although cutbanks are subject to caving during excavation.

The main limitation on sites for septic tank absorption fields is the rapid or very rapid permeability, which results in poor filtering of effluent and can cause contamination of ground water. Better suited sites should be selected.

No major limitations affect the use of this soil as a site for local roads and streets.

This soil is moderately suited to cultivated crops. The low available water capacity is the main limitation. The soil warms up rapidly in the spring, but unless irrigation water is applied, droughtiness in midsummer reduces

yields. Gravel and small stones may hinder tillage and cause wear on machinery.

This soil is moderately well suited to pasture and hay. Dry periods in midsummer result in poor growth. Grazing early in the spring is practical, but restricting grazing during dry periods helps to maintain the quality of the pasture.

The potential productivity of this soil for eastern white pine is high. The seedling mortality rate is high because of droughtiness.

No major limitations affect most kinds of recreational development. Small stones are a limitation on sites for playgrounds. Sandy fill material can be added to cover the stones.

The capability subclass is IIIs.

HnC—Hinckley gravelly loamy sand, 8 to 15 percent slopes. This strongly sloping soil is very deep and excessively drained. It is on the sides of terraces and on valley sides in the lowlands. Individual areas are long and narrow and range from 5 to about 25 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, very dark grayish brown gravelly loamy sand

Subsurface layer:
3 to 7 inches, dark brown gravelly loamy sand

Subsoil:
7 to 17 inches, dark yellowish brown very gravelly loamy sand

Substratum:
17 to 31 inches, light olive brown very gravelly sand
31 to 44 inches, light olive brown very gravelly coarse sand
44 to 49 inches, brown coarse sand
49 to 60 inches, brown very gravelly coarse sand

Included with this soil in mapping are areas of the moderately well drained and somewhat poorly drained Pompton soils. Pompton soils are slightly lower on the landscape than the Hinckley soil. Also included are small areas of Knickerbocker and Riverhead soils. Knickerbocker and Riverhead soils are less gravelly than the Hinckley soil. Included areas make up about 15 to 20 percent of the map unit and are 0.25 acre to 2.0 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Rapid (6.0-20 in/hr) in the surface layer and subsoil and very rapid (>20 in/hr) in the substratum
Available water capacity: Very low
Reaction: Extremely acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: More than 60 inches

Many areas of this soil are used for community development. Large areas have been mined for sand and gravel. A few areas are covered by brush, are wooded, or are used for pasture and hay.

The slope is the main limitation on sites for dwellings with basements. Designing the dwellings so that they conform to the natural slope of the land helps to overcome this limitation.

The main limitation on sites for septic tank absorption fields is the rapid or very rapid permeability, which results in poor filtering of effluent and can cause contamination of ground water. Better suited sites should be selected.

The slope is the main limitation on sites for local roads and streets. Designing the roads so that they conform to the natural slope of the land and cutting and filling help to overcome this limitation.

This soil is poorly suited to cultivated crops because of the slope. The low available water capacity and the moderate hazard of erosion also are management concerns. The soil warms up rapidly in the spring, but unless irrigation water is applied, droughtiness in midsummer reduces yields. A system of conservation tillage that leaves crop residue on the surface after planting combined with a system of crop rotation that includes several years of sod crops can help to control erosion. Returning crop residue to the soil and regularly adding other organic material can improve soil tilth.

This soil is moderately suited to pasture and hay. Dry periods in midsummer result in poor growth. Grazing early in the spring is practical, but restricting grazing during dry periods can help to maintain the quality of the pasture. Applications of fertilizer, weed and brush control, and rotation grazing can improve forage yields.

The potential productivity of this soil for eastern white pine is high. The seedling mortality rate is high because of droughtiness.

The slope is the main limitation affecting most kinds of recreational development. It is a particular concern in intensively used areas, such as playgrounds. Land grading and shaping can help to overcome this limitation. Small stones also are a limitation on sites for playgrounds. Sandy fill material can be added to cover the stones.

The capability subclass is IVs.

HnD—Hinckley gravelly loamy sand, 15 to 25 percent slopes. This moderately steep soil is very deep and excessively drained. It is on the sides of terraces, on valley sides, and on small rounded hills. Individual areas are rounded and range from 2 to about 15 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 3 inches, very dark grayish brown gravelly loamy sand

Subsurface layer:
3 to 7 inches, dark brown gravelly loamy sand

Subsoil:
7 to 17 inches, dark yellowish brown very gravelly loamy sand

Substratum:
17 to 31 inches, light olive brown very gravelly sand
31 to 44 inches, light olive brown very gravelly coarse sand
44 to 49 inches, brown coarse sand
49 to 60 inches, brown very gravelly coarse sand

Included with this soil in mapping are areas of the moderately well drained and somewhat poorly drained Pompton soils. Pompton soils are slightly lower on the landscape than the Hinckley soil. Also included are small areas of Knickerbocker and Riverhead soils, areas of Hinckley soils that contain more gravel at the surface, and areas that are more sloping than the Hinckley soil. Knickerbocker and Riverhead soils are less gravelly than the Hinckley soil. Included areas make up about 15 to 20 percent of the map unit and are 0.25 acre to 2.0 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Rapid (6.0-20 in/hr) in the surface layer and subsoil and very rapid (>20 in/hr) in the substratum
Available water capacity: Very low
Reaction: Extremely acid to moderately acid throughout the profile
Surface runoff: Medium or rapid
Erosion hazard: Severe
Depth to bedrock: More than 60 inches

Many areas of this soil are used for community development. Large areas have been mined for sand and gravel. A few areas are covered by brush, are wooded, or are used for pasture and hay.

The slope is the main limitation on sites for dwellings with basements. Designing the dwellings so that they conform to the natural slope of the land and land shaping and grading can help to overcome this limitation.

The main limitation on sites for septic tank absorption fields is the rapid or very rapid permeability, which results in poor filtering of effluent and can cause contamination of ground water. Better suited sites should be selected.

The slope is the main limitation on sites for local roads and streets. Designing the roads so that they conform to the natural slope of the land and cutting and filling as needed help to overcome this limitation.

This soil is not suited to cultivated crops because of the slope. It is only poorly suited to permanent pasture. Dry periods in midsummer result in poor growth. Grazing early in the spring is practical, but restricting grazing during dry periods can help to maintain the quality of the pasture. Applications of fertilizer, weed and brush control, and rotation grazing can improve forage yields.

The potential productivity of this soil for eastern white pine is high. The seedling mortality rate is high because of droughtiness. The equipment limitation and the hazard of erosion are moderate because of the slope.

The slope is the main limitation affecting most kinds of recreational development. It is a particular concern in intensively used areas, such as playgrounds. Land grading and shaping can help to overcome this limitation. Small stones also are a limitation on sites for playgrounds. Sandy fill material can be added to cover the stones.

The capability subclass is VIs.

HrF—Hollis-Rock outcrop complex, very steep. This unit consists of the shallow, very steep, well drained and somewhat excessively drained Hollis soil and areas of Rock outcrop, dominantly granite, gneiss, or schist. It is on hillsides in bedrock-controlled landscapes. Slopes range from 35 to 60 percent. Individual areas are long and narrow and range from 2 to 120 acres in size. They are typically about 60 percent Hollis soil, 20 percent Rock outcrop, and 20 percent other soils.

The typical sequence, depth, and composition of the layers of the Hollis soil are as follows—

Surface:
0 to 1 inch, dark brown fine sandy loam

Subsoil:
1 to 16 inches, dark yellowish brown fine sandy loam

Bedrock:
16 inches, fractured and folded granite

Included in mapping are narrow areas of the somewhat poorly drained and poorly drained Leicester soils, areas of the deep and very deep Charlton soils, and areas of the moderately deep Chatfield soils. Leicester soils are along drainageways. Charlton soils are along the base of the slopes. Chatfield soils are on the upper part of the slopes. Also included, generally in areas adjacent to the Rock outcrop, are soils that are less than 10 inches deep over bedrock. Included areas are as much as 2 acres in size.

Properties of the Hollis soil—

Water table: At a depth of more than 6 feet
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Very low
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Very rapid
Erosion hazard: Very severe
Depth to bedrock: 10 to 20 inches

Most areas of this unit are wooded. Some scattered areas are used for community development.

The main limitations on sites for dwellings with basements are the slope, the shallow depth to bedrock, and the Rock outcrop. More suitable sites should be selected.

The main limitations on sites for septic tank absorption fields are the slope, the shallow depth to bedrock, and the Rock outcrop. The soil is not deep enough over bedrock to adequately filter the effluent. Ground-water contamination is a hazard. More suitable sites should be selected.

The main limitations on sites for local roads and streets are the slope and the shallow depth to bedrock. Grading and road locations should be planned to avoid areas of this map unit.

This unit is not suited to cultivated crops, hay, or pasture because of the slope, the shallow depth to bedrock, and the Rock outcrop.

The potential productivity of this unit for northern red oak is moderate. The equipment limitation, the hazard of erosion, and the windthrow hazard are severe because of the slope and the shallow depth to bedrock. The seedling mortality rate is moderate because of droughtiness.

The capability subclass is VIIs.

Ip—Ipswich mucky peat. This soil is nearly level, very deep, and very poorly drained. It is in tidal marshes along the Hudson River and Long Island Sound. It is subject to daily tidal flooding. Individual areas are relatively long and narrow and range from 5 to 50 acres in size. Slopes range from 0 to 2 percent but are dominantly less than 1 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, very dark gray mucky peat

Subsurface layers:
8 to 20 inches, very dark gray muck
20 to 33 inches, very dark gray mucky peat

Bottom layer:
33 to 60 inches, very dark grayish brown mucky peat

Included with this soil in mapping are areas of Fluvaquents and Udifluvents and small areas of the Udorthents that have a wet substratum. Included areas make up about 15 percent of the map unit and are 1 to 2 acres in size.

Soil properties—

Water table: At the surface to 1 foot above throughout the year
Permeability: Moderate to rapid (0.6-2.0 in/hr) throughout the profile
Available water capacity: Very high
Reaction: Strongly acid to neutral throughout the profile
Surface runoff: Very slow or ponded
Depth to bedrock: More than 60 inches
Flooding: Frequent for very brief periods throughout the year

Most areas of this soil are covered by nonwoody, water-tolerant plants.

Wetness and flooding are the main limitations on sites for dwellings with basements, local roads and streets, septic tank absorption fields, and recreational development. Extensive alterations are necessary to overcome these limitations. Better suited sites should be selected for these uses.

This soil is not suited to cultivated crops or pasture because of the wetness and the flooding.

The capability subclass is VIIIw.

KnB—Knickerbocker fine sandy loam, 2 to 8 percent slopes. This soil is gently sloping, very deep, and somewhat excessively drained. It is in benchlike areas along streams and on rounded hilltops. Individual areas are somewhat oblong or rounded and range from 2 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, dark brown fine sandy loam

Subsoil:
9 to 19 inches, yellowish brown fine sandy loam
19 to 31 inches, dark yellowish brown loamy fine sand

Substratum:
31 to 60 inches, yellowish brown loamy fine sand

Included with this soil in mapping are small areas of Hinckley and Riverhead soils. Hinckley soils contain more gravel than the Knickerbocker soil, and Riverhead soils contain less sand. Also included are areas of the moderately well drained and somewhat poorly drained Pompton soils and some small areas that are subject to occasional flooding. Included areas make up about 15 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderately rapid (2.0-6.0 in/hr) in the surface layer and subsoil and rapid or very rapid (>6.0 in/hr) in the substratum
Available water capacity: Low or moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Slow
Erosion hazard: Slight
Depth to bedrock: More than 60 inches

Most areas are used for community development. Some areas have been partially mined for sand. A few areas are wooded.

No major limitations affect the use of this soil as a site for dwellings with basements.

The main limitation on sites for septic tank absorption fields is a poor filtering capacity, which may result in ground-water contamination. Better suited sites should be selected.

No major limitations affect the use of this soil as a site for local roads and streets.

This soil is only moderately suited to cultivated crops because of droughtiness. Returning crop residue to the soil and regularly adding other organic material can maintain or improve soil tilth and can increase the available water capacity.

This soil is moderately well suited to pasture and hay. Periods of droughtiness can significantly reduce yields. Rotation grazing, applications of fertilizer, and weed and brush control can increase yields.

The potential productivity of this soil for northern red oak is moderately high. No major limitations affect woodland use and management.

No major limitations affect recreational development. Because of the slope, grading and smoothing may be needed on sites for playgrounds and ball fields.

The capability subclass is IIIs.

KnC—Knickerbocker fine sandy loam, 8 to 15 percent slopes. This soil is strongly sloping, very deep, and somewhat excessively drained. It is in benchlike areas along streams and on rounded hilltops. Individual areas are somewhat oblong or rounded and range from 2 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, dark brown fine sandy loam

Subsoil:
9 to 19 inches, yellowish brown fine sandy loam
19 to 31 inches, dark yellowish brown loamy fine sand

Substratum:
31 to 60 inches, yellowish brown loamy fine sand

Included with this soil in mapping are small areas of Hinckley soils and Riverhead soils. Hinckley soils contain more gravel than the Knickerbocker soil, and Riverhead soils contain less sand. Also included are areas of the moderately well drained and somewhat poorly drained Pompton soils, some small areas that are subject to occasional flooding, and soils that are similar to the Knickerbocker soil but contain more silt and very fine sand throughout the profile. Included areas make up about 15 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderately rapid (2.0-6.0 in/hr) in the surface layer and subsoil and rapid or very rapid (>6.0 in/hr) in the substratum
Available water capacity: Low or moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: More than 60 inches

Most areas are used for community development. Some areas have been partially mined for sand. A few areas are wooded.

The slope is the main limitation on sites for dwellings with basements. Land shaping and grading help to

overcome this limitation. Erosion is a hazard during construction. Minimizing the removal of vegetative cover and revegetating soon after construction can help to control erosion.

The main limitation on sites for septic tank absorption fields is a poor filtering capacity, which may result in ground-water contamination. Better suited sites should be selected.

The slope is the main limitation on sites for local roads and streets. Land shaping and grading or designing the roads so that they conform to the natural slope of the land can help to overcome this limitation.

This soil is only moderately suited to cultivated crops because of droughtiness and the hazard of erosion. Returning crop residue to the soil and regularly adding other organic material can maintain or improve soil tilth and can increase the available water capacity. A system of conservation tillage that leaves crop residue on the surface and a system of crop rotation that includes several years of sod crops can help to control erosion.

This soil is moderately well suited to pasture and hay. Periods of droughtiness can significantly reduce yields. Overgrazing reduces plant growth and accelerates erosion. Rotation grazing, applications of fertilizer, and weed and brush control can increase yields.

The potential productivity of this soil for northern red oak is moderately high. No major limitations affect woodland use and management.

The slope is the main limitation affecting recreational development. Grading and smoothing can overcome this limitation.

The capability subclass is IIIe.

LcA—Leicester loam, 0 to 3 percent slopes, stony. This soil is nearly level, very deep, and somewhat poorly drained and poorly drained. It is in the uplands and along small drainageways in bedrock-controlled areas. Stones larger than 10 inches in diameter cover 0.01 to 0.1 percent of the surface and are about 25 to 75 feet apart. Individual areas of this unit are irregularly shaped or occur as long and narrow strips about 2 to 10 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches, very dark grayish brown loam

Subsoil:

8 to 18 inches, dark grayish brown sandy loam that has yellowish brown mottles

18 to 26 inches, brown sandy loam that has yellowish brown and grayish brown mottles

Substratum:

26 to 60 inches, brown sandy loam that has yellowish brown, strong brown, and gray mottles

Included with this soil in mapping are areas of the poorly drained and very poorly drained Sun soils in depressions, the moderately well drained Sutton soils in the slightly higher landscape positions, and the gravelly, very stony, or bouldery Leicester soils. Included areas make up about 15 percent of the map unit and are generally 1 to 3 acres in size.

Soil properties—

Water table: Within a depth of 1.5 feet from November through May

Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) in the surface layer and subsoil and moderate to rapid (0.6-20 in/hr) in the substratum

Available water capacity: Moderate

Reaction: Very strongly acid or strongly acid in the surface layer and subsoil and very strongly acid to moderately acid in the substratum

Surface runoff: Slow

Erosion hazard: Slight

Depth to bedrock: More than 60 inches

Most areas of this soil are wooded or are covered by brush. Some areas are used for community development or agriculture.

The main limitation on sites for dwellings with basements is wetness. This soil is more suited to dwellings without basements than to dwellings with basements. Selecting a high area of the map unit, land shaping and grading, and installing a drainage system around the footings help to overcome the wetness.

The wetness is the main limitation on sites for septic tank absorption fields. Installing a drainage system around the absorption fields and installing diversions to intercept water from the higher areas help to overcome this limitation.

The main limitations on sites for local roads and streets are the wetness and a high potential for frost action. Constructing the roads on raised fill material of coarse grained subgrade and installing a drainage system help to overcome these limitations.

This soil is only moderately suited to cultivated crops because of the wetness. Installing diversions to intercept water from the higher areas and providing surface ditches help to overcome this limitation.

This soil is moderately well suited to hay and pasture. The wetness can interfere with some farming activities and can limit the varieties selected for planting. Proper stocking rates and restricted grazing

during wet periods can help to maintain the quality of the pasture.

The potential productivity of this soil for red maple is moderate. The equipment limitation, seedling mortality, and the windthrow hazard are severe because of the wetness.

The capability subclass is IIIw.

LcB—Leicester loam, 3 to 8 percent slopes, stony. This soil is gently sloping, very deep, and somewhat poorly drained and poorly drained. It is on the lower parts of hillsides and along small drainageways in bedrock-controlled areas. Stones larger than 10 inches in diameter cover 0.01 to 0.1 percent of the surface and are about 25 to 75 feet apart. Individual areas of this unit are irregularly shaped or occur as long and narrow strips about 2 to 10 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches, very dark grayish brown loam

Subsoil:

8 to 18 inches, dark grayish brown sandy loam that has yellowish brown mottles

18 to 26 inches, brown sandy loam that has yellowish brown and grayish brown mottles

Substratum:

26 to 60 inches, brown sandy loam that has yellowish brown, strong brown, and gray mottles

Included with this soil in mapping are areas of the poorly drained and very poorly drained Sun soils in depressions and the moderately well drained Sutton soils in the slightly higher landscape positions. Also included are areas of the well drained Charlton soils in the higher areas and the gravelly, very stony, or bouldery Leicester soils. Included areas are generally 1 to 3 acres in size and make up about 15 percent of the map unit.

Soil properties—

Water table: Within a depth of 1.5 feet from November through May

Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) in the surface layer and subsoil and moderate to rapid (0.6-20 in/hr) in the substratum

Available water capacity: Moderate

Reaction: Very strongly acid or strongly acid in the surface layer and subsoil and very strongly acid to moderately acid in the substratum

Surface runoff: Medium

Erosion hazard: Moderate

Depth to bedrock: More than 60 inches

Most areas of this soil are wooded or covered by brush. Some areas are used for community development or agriculture.

The main limitation on sites for dwellings with basements is wetness. This soil is more suited to dwellings without basements than to dwellings with basements. Selecting a high area of the map unit, land shaping and grading, and installing a drainage system around the footings help to overcome the wetness.

The wetness is the main limitation on sites for septic tank absorption fields. Installing a drainage system around the absorption fields and installing diversions to intercept water from the higher areas help to overcome this limitation.

The main limitations on sites for local roads and streets are the wetness and a high potential for frost action. Constructing the roads on raised fill material of coarse grained subgrade and installing a drainage system help to overcome these limitations.

This soil is only moderately suited to cultivated crops because of the wetness. Erosion also is a hazard. Installing diversions to intercept water from the higher areas and providing surface ditches help to overcome the wetness. A conservation tillage system that leaves crop residue on the surface helps to control erosion.

This soil is moderately well suited to hay and pasture. The wetness can interfere with some farming activities and can limit the varieties selected for planting. Proper stocking rates and restricted grazing during wet periods can help to maintain the quality of the pasture.

The potential productivity of this soil for red maple is moderate. The equipment limitation, seedling mortality, and the windthrow hazard are severe because of the wetness.

The capability subclass is IIIw.

LeB—Leicester loam, 2 to 8 percent slopes, very stony. This soil is gently sloping, very deep, and somewhat poorly drained and poorly drained. It is on the lower parts of hillsides and along small drainageways in bedrock-controlled areas. Stones larger than 10 inches in diameter cover 0.1 to 3.0 percent of the surface and are about 3 to 25 feet apart. Individual areas of this unit are irregular in shape and range from about 2 to 10 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches, very dark grayish brown loam

Subsoil:

8 to 18 inches, dark grayish brown sandy loam that has yellowish brown mottles

18 to 26 inches, brown sandy loam that has yellowish brown and grayish brown mottles

Substratum:

26 to 60 inches, brown sandy loam that has yellowish brown, strong brown, and gray mottles

Included with this soil in mapping are areas of the poorly drained and very poorly drained Sun soils in depressions and the moderately well drained Sutton soils in the slightly higher areas. Also included are areas of the well drained Charlton soils in the higher areas and areas of Leicester soils that are gravelly, extremely stony, or bouldery. Included areas make up about 15 percent of the map unit and are generally 1 to 3 acres in size.

Soil properties—

Water table: Within a depth of 1.5 feet from November through May
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) in the surface layer and subsoil and moderate to rapid (0.6-20 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid or strongly acid in the surface layer and subsoil and very strongly acid to moderately acid in the substratum
Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: More than 60 inches

Most areas of this soil are wooded or support brushy plants. Some areas are used for community development.

The main limitation on sites for dwellings with basements is wetness. This soil is more suitable for dwellings without basements than for dwellings with basements. Selecting a high area of the map unit, land shaping and grading, and installing a drainage system around the footings help to overcome the wetness.

The wetness is the main limitation on sites for septic tank absorption fields. Installing a drainage system around the absorption fields and installing diversions to intercept water from the higher areas help to overcome this limitation.

The main limitations on sites for local roads and streets are the wetness and a high potential for frost action. Constructing the roads on raised fill material of coarse grained subgrade and installing a drainage system help to overcome these limitations.

This soil is not suited to cultivated crops because of surface stones and the wetness. It is only poorly suited to permanent pasture. Installing diversions to intercept water from the higher areas and providing surface ditches help to overcome the wetness. Proper stocking rates and restricted grazing during wet periods can help to maintain the quality of the pasture.

The potential productivity of this soil for red maple is moderate. The equipment limitation, seedling mortality, and the windthrow hazard are severe because of the wetness.

The capability subclass is VIIs.

Pa—Palms muck. This soil is nearly level, very deep, and very poorly drained. It consists of 16 to 51 inches of organic material over mineral soil material. It is in depressions between hills and adjacent to streams. Individual areas are commonly oval or narrow and range from 2 to 100 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 10 inches, very dark brown muck

Subsurface layers:

10 to 34 inches, black muck
34 to 48 inches, dark brown muck

Substratum:

48 to 60 inches, dark gray loam

Included with this soil in mapping are small areas of Carlisle soils that have organic material more than 51 inches thick; Fluvaquents and Udifluvents along drainageways where flooding is frequent; small areas of organic material over sand and gravel; and the poorly drained or very poorly drained, mineral Sun soils surrounding areas of the Palms soil. Also included are small islandlike areas of mineral soils. Included areas make up about 20 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: 6 inches above to 12 inches below the surface from September through June, receding to a depth of 24 inches during dry periods
Permeability: Moderately slow to moderately rapid (0.2-6.0 in/hr) in the surface layer and subsurface layer and moderately slow or moderate (0.2-2.0 in/hr) in the substratum
Available water capacity: High
Reaction: Strongly acid to mildly alkaline in the surface layer and subsurface layer
Surface runoff: Very slow or ponded
Depth to bedrock: More than 60 inches

Most areas are wooded or are covered by brush or water-tolerant herbaceous plants.

The main limitations on sites for dwellings with basements are the seasonal high water table, the

ponding, and low strength. Better suited soils are in nearby areas.

The main limitations on sites for septic tank absorption fields are the ponding and slow percolation. Better suited soils are in nearby areas.

The main limitations on sites for local roads and streets are the ponding, frost action, and the low strength. Coarse grained base material and an adequate drainage system are necessary to overcome these limitations. Roads should be routed around areas of this soil if possible.

This soil is poorly suited to cultivated crops, hay, and pasture because of the seasonal high water table, the ponding, and the low strength.

The potential productivity of this soil for timber is moderate. The use of planting and harvesting equipment is limited by the ponding and the low strength. The seedling mortality rate is high because of excess wetness. The seasonal high water table restricts root growth and thus increases the windthrow hazard. Water-tolerant species of ornamental trees and shrubs should be selected for planting.

This soil has good potential as wetland wildlife habitat. Water-tolerant plants provide food and cover for waterfowl, muskrat, mink, and beaver.

The capability subclass is Vw.

Pc—Palms and Carlisle soils, ponded. This unit consists of nearly level, very deep, very poorly drained soils in depressions or in areas bordering lakes or streams. These soils are inundated throughout most of the year. The relative proportion of the two soils varies from one area to another. Some areas are made up entirely of one of the soils, and other areas contain both soils. Slopes are 0 to 1 percent. Individual areas are irregularly shaped or roughly oval and range from 2 to 30 acres in size. They are about 45 percent Palms soil and 40 percent Carlisle soil.

The typical sequence, depth, and composition of the layers of the Palms soil are as follows—

Surface layer:
0 to 10 inches, very dark brown muck

Subsurface layers:
10 to 34 inches, black muck
34 to 48 inches, dark brown muck

Substratum:
48 to 60 inches, dark gray loam

The typical sequence, depth, and composition of the layers of the Carlisle soil are as follows—

Surface layer:
0 to 4 inches, dark reddish brown muck

Subsurface layers:
4 to 52 inches, black muck that has some woody fragments
52 to 60 inches, dark reddish brown muck

Included with these soils in mapping are small areas of inundated mineral soils. Also included in a few areas are small islands of mineral soils above the water level. Bedrock is commonly near the surface of these islands. Small areas of Fluvaquents and Udifluvents are also included at the edge of the mapped areas near streams. Some areas near the edge of the unit may not be covered with water, particularly during the summer. Included areas make up about 15 percent of the map unit and are as much as 2 acres in size.

Properties of the Palms soil—

Water table: 1 foot above to 1 foot below the surface from November through May
Permeability: Moderate or moderately rapid in the organic layers and moderate or moderately slow in the substratum
Available water capacity: Very high
Reaction: Strongly acid to mildly alkaline in the organic layers and slightly acid to moderately alkaline in the substratum
Surface runoff: Ponded
Depth to bedrock: More than 60 inches
Erosion hazard: Susceptible to wind erosion
Flooding: None

Properties of the Carlisle soil—

Water table: 0.5 foot above to 1.0 foot below the surface from September through June
Permeability: Moderately slow to moderately rapid throughout the profile
Available water capacity: Very high
Reaction: Very strongly acid to neutral throughout the profile
Surface runoff: Ponded
Depth to bedrock: More than 60 inches
Erosion hazard: Susceptible to wind erosion
Flooding: None

Areas of these soils are covered by freshwater marshes and support various wetland plants, shrubs, and a few trees.

The main limitations on sites for dwellings, local roads and streets, and septic tank absorption fields are low strength and the prolonged periods of wetness. Adjacent areas of mineral soils in the uplands are more suited to these uses.

These soils are not suited to cultivated crops, hay, or pasture because of the wetness and the ponding.

The potential productivity of these soils for red maple

is moderate. The equipment limitation is severe because of the wetness and the high content of organic matter. The windthrow hazard is severe because of the wetness, which restricts root growth. Seedling mortality also is severe because of the wetness. Trees are generally not grown in areas of these soils.

The capability subclass is VIIIw.

PnB—Paxton fine sandy loam, 2 to 8 percent slopes. This soil is gently sloping, very deep, and well drained. It is on broad ridges and small hills. Individual areas are irregularly shaped or are long and narrow. They range from about 2 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 10 inches, dark brown fine sandy loam

Subsoil:
10 to 17 inches, dark yellowish brown loam
17 to 20 inches, olive brown sandy loam

Substratum:
20 to 25 inches, olive brown, firm sandy loam
25 to 60 inches, dark grayish brown, very firm gravelly sandy loam

Included with this soil in mapping are a few areas of the moderately well drained Woodbridge soils, small areas of the somewhat poorly drained Ridgebury soils, small areas of Charlton soils that do not have a dense substratum, and areas of rock outcrop. Woodbridge soils are on the lower concave side slopes and at the bottom of hills. Ridgebury soils are along drainageways. The rock outcrop is in a few areas, generally near areas of Chatfield or Hollis soils. Also included are a few soils that have a very stony surface. Included areas make up about 15 percent of the map unit and are 1 to 2 acres in size.

Soil properties—

Water table: Perched above the dense substratum at a depth of 1.5 to 2.5 feet from February through April
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer and subsoil and slow or very slow (<0.2 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Slight
Depth to bedrock: More than 60 inches

Many areas of this soil are used for community development. A few areas are used for farming, and other areas are wooded (fig. 7).

The main limitation on sites for dwellings with basements is the seasonal wetness. The wetness can be overcome by installing drains around the footings, sealing the foundation, and land shaping to divert surface water away from the buildings.

The main limitation on sites for septic tank absorption fields is the slow or very slow permeability in the substratum. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed.

The main limitations on sites for local roads and streets are wetness and frost action. Constructing the roads on raised fill of coarse grained material helps to overcome these limitations.

This soil is suited to pasture, hay, and cultivated crops. Erosion is a slight hazard in cultivated areas. Contour farming and a conservation cropping system that leaves crop residue on the surface help to control erosion.

The potential productivity of this soil for northern red oak is moderate. The seedling mortality rate is moderate because of the wetness.

The capability subclass is IIe.

PnC—Paxton fine sandy loam, 8 to 15 percent slopes. This soil is strongly sloping, very deep, and well drained. It is on the sides and tops of broad ridges and small hills. Individual areas are irregularly shaped or are long and narrow. They range from about 2 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 10 inches, dark brown fine sandy loam

Subsoil:
10 to 17 inches, dark yellowish brown loam
17 to 20 inches, olive brown sandy loam

Substratum:
20 to 25 inches, olive brown, firm sandy loam
25 to 60 inches, dark grayish brown, very firm gravelly sandy loam

Included with this soil in mapping are a few areas of the moderately well drained Woodbridge soils, small areas of the somewhat poorly drained Ridgebury soils, small areas of Charlton soils that do not have a dense substratum, and areas of rock outcrop. Woodbridge soils are on the lower concave side slopes and at the bottom of hills. Ridgebury soils are along drainageways. The rock outcrop is in a few areas, generally near areas of Chatfield or Hollis soils. Also included are a few soils that have a very stony surface. Included areas make up about 15 percent of the map unit and are 1 to 2 acres in size.

Figure 7.—An area of Paxton fine sandy loam, 2 to 8 percent slopes, used for hay, fruit trees, and woodland.

Soil properties—

Water table: Perched above the dense substratum at a depth of 1.5 to 2.5 feet from February through April
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer and subsoil and slow or very slow (<0.2 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile

Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: More than 60 inches

Many areas of this soil are used for community development. A few areas are used for farming, and other areas are wooded.

The main limitations on sites for dwellings with basements are the slope and the seasonal wetness. Land shaping and designing the structures so that they conform to the natural slope of the land help to overcome the slope. The wetness can be reduced by installing drains around footings, sealing the foundation, and land shaping to divert surface water away from the buildings.

The main limitation on sites for septic tank absorption fields is the slow or very slow permeability in the substratum. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed.

The main limitations on sites for local roads and streets are the wetness, the slope, and frost action. Constructing the roads on raised fill of coarse grained material helps to overcome these limitations. Designing roads and streets so that they conform to the natural slope of the land also helps to overcome the slope.

This soil is suited to pasture, hay, and cultivated crops. Erosion is a moderate hazard in cultivated areas. Contour farming and a conservation cropping system that leaves crop residue on the surface help to control erosion.

The potential productivity of this soil for northern red oak is moderate. The seedling mortality rate is moderate because of the wetness.

The capability subclass is IIIe.

PnD—Paxton fine sandy loam, 15 to 25 percent slopes. This soil is moderately steep, very deep, and well drained. It is on side slopes of broad ridges and small hills. Individual areas are irregularly shaped or are long and narrow. They range from about 2 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 10 inches, dark brown fine sandy loam

Subsoil:
10 to 17 inches, dark yellowish brown loam
17 to 20 inches, olive brown sandy loam

Substratum:
20 to 25 inches, olive brown, firm sandy loam
25 to 60 inches, dark grayish brown, very firm gravelly sandy loam

Included with this soil in mapping are a few areas of the moderately well drained Woodbridge soils, small areas of the somewhat poorly drained Ridgebury soils, small areas of Charlton soils that do not have a dense substratum, and a few areas of rock outcrop. Woodbridge soils are on the lower concave side slopes and at the bottom of hills. Ridgebury soils are along drainageways. The rock outcrop is commonly near areas of Chatfield or Hollis soils. Also included are a few soils that have a very stony surface. Included areas make up about 15 percent of the map unit and are 1 to 2 acres in size.

Soil properties—

Water table: Perched above the dense substratum at a depth of 1.5 to 2.5 feet from February through April
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer and subsoil and slow or very slow (<0.2 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Erosion hazard: Severe
Depth to bedrock: More than 60 inches

Many areas of this soil are wooded or are covered by brush. Some areas are used for community development, particularly in the southern half of the survey area. A few areas are used for farming.

The main limitation on sites for dwellings with basements is the slope. Land shaping and designing the structures so that they conform to the natural slope of the land can help to overcome this limitation. Seasonal wetness also is a limitation. It can be overcome by installing drains around the footings, sealing the foundation, and land shaping to divert surface water away from buildings.

The main limitations on sites for septic tank absorption fields are the slow or very slow permeability in the substratum and the moderately steep slope. More suitable sites should be selected, or a specially designed system should be installed.

The slope is the main limitation on sites for local roads and streets. Building the roads on the contour and land shaping and grading can help to overcome this limitation.

This soil is suited to pasture and hay, but it is only poorly suited to cultivated crops because of the slope and the hazard of erosion. Overgrazing is the main management concern. It decreases the extent of desirable pasture plants and accelerates erosion.

The potential productivity of this soil for northern red oak is moderate. The hazard of erosion, the equipment limitation, and the seedling mortality rate are moderate

because of the slope. Building logging and maintenance roads on the contour helps to control erosion.

The capability subclass is IVe.

PoB—Paxton fine sandy loam, 2 to 8 percent slopes, very stony. This soil is gently sloping, very deep, and well drained. It is on convex hilltops and side slopes. Individual areas are irregularly shaped and range from about 2 to 100 acres in size. Stones cover 0.1 to 3.0 percent of the surface and are 3 to 25 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 10 inches, dark brown fine sandy loam

Subsoil:
10 to 17 inches, dark yellowish brown loam
17 to 20 inches, olive brown sandy loam

Substratum:
20 to 25 inches, olive brown, firm sandy loam
25 to 60 inches, dark grayish brown, very firm gravelly sandy loam

Included with this soil in mapping are a few areas of the moderately well drained Woodbridge soils, small areas of the somewhat poorly drained and poorly drained Ridgebury soils, small areas of the well drained Charlton soils that do not have a dense substratum, and a few areas of rock outcrop. Woodbridge soils are on concave side slopes and on the lower parts of hillsides. Ridgebury soils are on flatter slopes than the Paxton soil and are along drainageways. The rock outcrop is commonly near areas of Chatfield or Hollis soils. Also included are a few soils that do not have a very stony surface. Included areas make up about 15 percent of the map unit and are 0.25 acre to 2.0 acres in size.

Soil properties—

Water table: Perched above the dense substratum at a depth of 1.5 to 2.5 feet from February through April
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer and subsoil and slow or very slow (<0.2 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Slight
Depth to bedrock: More than 60 inches

Many areas of this soil are used for community or commercial development, particularly in the southern half of the survey area. Some areas are used for pasture and hay. Other areas are covered by brush or are wooded.

The main limitation on sites for dwellings with basements is seasonal wetness. Installing drains around the footings, sealing the foundation, and land shaping to divert surface water away from the buildings help to overcome this limitation.

The main limitation on sites for septic tank absorption fields is the slow or very slow permeability in the substratum. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed.

The main limitations on sites for local roads and streets are the wetness and frost action. Building on raised fill material and installing a drainage system help to overcome the wetness. Adding coarse grained subgrade or base material to the soil at frost depth can reduce the effects of frost action.

This soil is not suited to cultivated crops because of the large stones on the surface. It is suited to pasture and hay. Overgrazing is the main management concern. It decreases the extent of desirable pasture plants and increases the hazard of erosion.

The potential productivity of this soil for northern red oak is moderate. The windthrow hazard is moderate because of the restricted rooting depth.

The capability subclass is VIs.

PoC—Paxton fine sandy loam, 8 to 15 percent slopes, very stony. This soil is strongly sloping, very deep, and well drained. It is on convex hilltops and side slopes. Individual areas are irregularly shaped and range from about 2 to 100 acres in size. Stones cover 0.1 to 3.0 percent of the surface and are 3 to 25 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 10 inches, dark brown fine sandy loam

Subsoil:
10 to 17 inches, dark yellowish brown loam
17 to 20 inches, olive brown sandy loam

Substratum:
20 to 25 inches, olive brown, firm sandy loam
25 to 60 inches, dark grayish brown, very firm gravelly sandy loam

Included with this soil in mapping are a few areas of the moderately well drained Woodbridge soils, small areas of the poorly drained and somewhat poorly drained Ridgebury soils, small areas of the well drained Charlton soils that do not have a dense substratum, and a few areas of rock outcrop. Woodbridge soils are on

concave side slopes and on the lower parts of hillsides. Ridgebury soils are on flatter slopes than the Paxton soil and are along drainageways. The rock outcrop is commonly near areas of Chatfield or Hollis soils. Also included are a few soils that do not have a very stony surface. Included areas make up about 15 percent of the map unit and are 0.25 acre to 2.0 acres in size.

Soil properties—

Water table: Perched above the dense substratum at a depth of 1.5 to 2.5 feet from February through April
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer and subsoil and slow or very slow (<0.2 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: More than 60 inches

Many areas of this soil are used for community or commercial development, particularly in the southern half of the survey area. Some areas are used for pasture and hay. Other areas are covered by brush or are wooded.

The main limitations on sites for dwellings with basements are the seasonal wetness and the slope. Installing drains around the footings, sealing the foundation, and land shaping to divert surface water away from the buildings help to overcome the wetness. Land shaping and constructing the dwellings so that they conform to the natural slope of the land help to overcome the slope.

The main limitation on sites for septic tank absorption fields is the slow or very slow permeability in the substratum. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed.

The main limitations on sites for local roads and streets are the seasonal wetness, the slope, and frost action. Building on raised fill material and installing a drainage system help to overcome the wetness. Adding coarse grained subgrade or base material to the soil at frost depth can reduce the effects of frost action. Land shaping and grading can help to overcome the slope, or the roads can be designed so that they conform to the natural slope of the land.

This soil is not suited to cultivated crops because of the large stones on the surface. It is suited to pasture and hay. Overgrazing is the main management concern. It decreases the extent of desirable pasture plants and increases the hazard of erosion.

The potential productivity of this soil for northern red oak is moderate. The windthrow hazard is moderate because of the restricted rooting depth.

The capability subclass is VIs.

PoD—Paxton fine sandy loam, 15 to 25 percent slopes, very stony. This soil is moderately steep, very deep, and well drained. It is on side slopes of broad ridges and small hills. Individual areas are irregularly shaped or are long and narrow. They range from about 2 to 5 acres in size. Stones cover 0.1 to 3.0 percent of the surface and are 3 to 25 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 10 inches, dark brown fine sandy loam

Subsoil:
10 to 17 inches, dark yellowish brown loam
17 to 20 inches, olive brown sandy loam

Substratum:
20 to 25 inches, olive brown, firm sandy loam
25 to 60 inches, dark grayish brown, very firm gravelly sandy loam

Included with this soil in mapping are a few areas of the moderately well drained Woodbridge soils, small areas of the poorly drained and somewhat poorly drained Ridgebury soils, small areas of the well drained Charlton soils that do not have a dense substratum, and a few areas of rock outcrop. Woodbridge soils are on concave side slopes and on the lower parts of hillsides. Ridgebury soils are on flatter slopes than the Paxton soil and are along drainageways. The rock outcrop is commonly near areas of Chatfield or Hollis soils. Also included are a few soils that do not have a very stony surface. Included areas make up about 15 percent of the map unit and are 0.25 acre to 2.0 acres in size.

Soil properties—

Water table: Perched above the dense substratum at a depth of 1.5 to 2.5 feet from February through April
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer and subsoil and slow or very slow (<0.2 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Erosion hazard: Severe
Depth to bedrock: More than 60 inches

Many areas of this soil are used for community or commercial development, particularly in the southern half of the survey area. Some areas are used for

pasture and hay. Other areas are covered by brush or are wooded.

The main limitations on sites for dwellings with basements are seasonal wetness and the slope. Installing drains around the footings, sealing the foundation, and land shaping to divert surface water away from the buildings help to overcome the wetness. Land shaping and constructing the dwellings so that they conform to the natural slope of the land help to overcome the slope.

The main limitations on sites for septic tank absorption fields are the slow or very slow permeability in the substratum and the slope. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed. Installing distribution lines on the contour and adding distribution boxes or other structures to ensure even distribution of effluent can help to overcome the slope.

The main limitations on sites for local roads and streets are the seasonal wetness, the slope, and frost action. Building on raised fill material and installing a drainage system help to overcome the wetness. Adding coarse grained subgrade or base material to the soil at frost depth reduces the effects of frost action. Land shaping and grading can help to overcome the slope, or the roads can be designed so that they conform to the natural slope of the land.

This soil is not suited to cultivated crops because of the large stones on the surface. It is suited to pasture and hay. Overgrazing is the main management concern. It decreases the extent of desirable pasture plants and increases the hazard of erosion.

The potential productivity of this soil for northern red oak is moderate. The windthrow hazard is moderate because of the restricted rooting depth.

The capability subclass is VIs.

Pt—Pits, gravel. This unit consists of areas that have been excavated for sand and gravel. Individual areas are irregularly shaped and range from 5 to 100 acres in size. Many of the pits have short, steep slopes along the edges.

The rate of water movement through the material is rapid or very rapid. In some areas the water table is at or near the surface throughout most of the year. A few areas are adjacent to streams and are subject to periodic flooding.

Included in mapping are small areas of undisturbed soils. These soils include the excessively drained Hinckley soils, the well drained Riverhead soils, the somewhat excessively drained Knickerbocker soils, and some small areas of the wetter Pompton or Fredon soils. Also included are areas of exposed bedrock, areas of spoil consisting of sandy or gravelly overburden, and a few small ponds.

A few abandoned gravel pits are used for community development. Onsite investigation is needed to determine the feasibility for most uses.

A capability subclass is not assigned.

Pv—Pits, quarry. This map unit consists mostly of exposed bedrock in areas that have been partially mined for rock. Many of these pits have rolling or hilly surfaces and steep or very steep slopes along the edges. Individual areas are irregularly shaped and range from 2 to 40 acres in size.

Included with this unit in mapping are small areas of Charlton, Chatfield, and Hollis soils where the overlying soil material is undisturbed and areas of disturbed soils or soil material. Also included are small areas that are poorly drained or ponded.

Surface runoff ranges from slow to very rapid. Other soil properties vary greatly and can be determined only by onsite investigation. Some abandoned quarries are used for community development. Onsite investigation is needed to determine the potential for most uses (fig. 8).

A capability subclass is not assigned.

Pw—Pompton silt loam, loamy substratum. This soil is nearly level, very deep, and moderately well drained and somewhat poorly drained. It is in flat areas near streams and on small plains in the lowlands. It is subject to rare flooding. Individual areas are long and narrow or are irregularly shaped. They range from about 2 to 15 acres in size. Slopes range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, dark brown silt loam

Subsoil:
8 to 15 inches, yellowish brown fine sandy loam
15 to 21 inches, yellowish brown gravelly fine sandy loam that has brown mottles
21 to 26 inches, light olive brown gravelly sandy loam that has grayish brown mottles

Substratum:
26 to 44 inches, dark yellowish brown and dark brown very gravelly loamy sand
44 to 50 inches, dark yellowish brown and brown gravelly sand
50 to 60 inches, yellowish brown gravelly loam that has light brownish gray and yellowish brown mottles

Included with this soil in mapping are areas of the

Figure 8.—An abandoned quarry used for wildlife habitat and recreation.

well drained Riverhead soils, the somewhat excessively drained Knickerbocker soils, areas of the excessively drained Hinckley soils, small areas of the somewhat poorly drained and poorly drained Fredon soils, and areas of the well drained to very poorly drained Fluvaquents and Udifluvents. Knickerbocker soils are on the higher knolls or in sloping areas. Hinckley soils also are on the higher knolls. They are more gravelly than the Pompton soil. Fredon soils are in depressions. Fluvaquents and Udifluvents commonly are along streams. Included areas make up about 15 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: 0.5 foot to 2.0 feet below the surface from October through May

Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) in the surface layer and subsoil, rapid or very rapid (>6.0 in/hr) in the upper part of the substratum, and moderate or moderately rapid (0.6-6.0 in/hr) in the lower part of the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid in the surface layer and strongly acid or very strongly acid in the subsoil and substratum
Surface runoff: Slow
Erosion hazard: Slight
Depth to bedrock: More than 60 inches
Flooding hazard: Rare

Most areas of this soil are covered by brush or are wooded. A few areas are used for community development or farming.

Wetness and the rare flooding are the main limitations on sites for dwellings with basements. Adjacent soils that are higher on the landscape and are better drained and are not susceptible to flooding are more suited to this use.

The wetness and a poor filtering capacity are limitations on sites for septic tank absorption fields. The poor filtering capacity may result in contamination of ground water. Better suited sites should be considered.

Susceptibility to frost action is a limitation on sites for local roads and streets. Installing a drainage system and adding coarse grained subgrade or base material to the soil at frost depth can help to overcome this limitation.

This soil is suited to cultivated crops, hay, and pasture. The wetness may hinder some farming activities. The soil is friable and is relatively easy to till throughout a wide range in moisture content. Overgrazing and grazing when the soil is too wet are the main management concerns.

The potential productivity of this soil for white oak is moderately high. Seedling mortality, the windthrow hazard, and the equipment limitation are severe because of the wetness.

The capability subclass is IIw.

Ra—Raynham silt loam. This soil is nearly level, verv deep, and poorly drained. It is on old lake plains adjacent to perennial streams and in slight depressions in the uplands. Individual areas are roughly oval and range from about 3 to 20 acres in size. Slopes range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 12 inches, dark brown silt loam

Subsoil:
12 to 17 inches, olive brown silt loam that has gray, yellowish brown, and yellowish red mottles
17 to 32 inches, light olive brown and gray silt loam that has yellowish brown mottles

Substratum:
32 to 42 inches, brown silt loam that has gray and yellowish brown mottles
42 to 60 inches, olive very fine sandy loam that has yellowish brown mottles

Included with this soil in mapping are the well drained Unadilla soils, a few small areas of soils that are subject to flooding, and small areas of Sun and Leicester soils. Unadilla soils are in the slightly higher areas. Sun and Leicester soils are commonly along the edges of the mapped areas in the uplands. Also included are a few areas of soils that have a subsoil of silty clay loam. Included areas make up about 15 percent of the map unit and range from 0.25 acre to 2.0 acres in size.

Soil properties—

Water table: 0.5 foot to 2.0 feet below the surface from November through May
Permeability: Moderate or moderately slow (0.2-2.0 in/hr) in the surface layer and subsoil and slow (0.06-0.2 in/hr) in the substratum
Available water capacity: High
Reaction: Strongly acid to neutral in the surface layer and subsoil and moderately acid to mildly alkaline in the substratum
Surface runoff: Slow
Erosion hazard: Slight
Depth to bedrock: More than 60 inches

Most areas of this soil are wooded or are covered by brush. A few areas are used for community development or farming.

The main limitation on sites for dwellings with basements is wetness. Better suited soils are in nearby areas. Installing drains around the footings and foundations can remove subsurface water. Land shaping to divert runoff away from the dwellings can remove surface water.

The main limitations on sites for septic tank absorption fields are the wetness and slow percolation. Better suited soils should be selected, or a specially designed or alternative system may be installed. Installing a drainage system around the absorption fields and constructing diversions to intercept runoff from the higher areas help to overcome the wetness.

The main limitations on sites for local roads and streets are the wetness and a high potential for frost action. Building on raised fill material, installing a

drainage system, and adding coarse grained subgrade help to overcome these limitations.

Except where drained, this soil is not suited to cultivated crops. It is suited to hay and pasture. The wetness limits the selection of forage crops that can be grown and interferes with farming. Proper stocking rates and restricted grazing during wet periods can help to maintain the quality of the pasture.

The potential productivity of this soil for red maple is moderate. The equipment limitation and the windthrow hazard are severe because of the wetness, and the seedling mortality rate is moderate.

The capability subclass is IVw.

RdA—Ridgebury loam, 0 to 3 percent slopes. This soil is nearly level, very deep, and poorly drained and somewhat poorly drained. It is in the uplands and along small drainageways. Individual areas are irregularly shaped or elongated and generally range from 2 to 20 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, very dark grayish brown loam

Subsoil:
8 to 16 inches, brown gravelly fine sandy loam that has light brownish gray and dark yellowish brown mottles
16 to 26 inches, grayish brown gravelly fine sandy loam that has yellowish brown and light olive brown mottles

Substratum:
26 to 34 inches, light olive brown gravelly fine sandy loam that has grayish brown and olive yellow mottles
34 to 60 inches, olive brown gravelly loam that has brownish yellow mottles

Included with this soil in mapping are small areas of the poorly drained and very poorly drained Sun soils, areas of the moderately well drained Woodbridge soils, bouldery or very stony areas, and soils that have a friable substratum. Sun soils are in depressions. Woodbridge soils are in the higher areas. Included areas make up about 15 percent of the map unit and are generally 1 to 3 acres in size.

Soil properties—

Water table: Within a depth of 1.5 feet from November through May
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) in the surface layer and subsoil and slow or very slow (<0.02 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to slightly acid throughout the profile
Surface runoff: Slow
Erosion hazard: Slight
Depth to bedrock: More than 60 inches

Most areas of this soil are wooded or are covered by brush. A few areas are used for community development or pasture.

The main limitation on sites for dwellings with basements is wetness. Installing drains around the footings and foundations can lower the water table. Diverting runoff away from the dwellings can remove surface water.

The main limitations on sites for septic tank absorption fields are the seasonal wetness and the slow permeability in the dense substratum. Better suited soils should be selected, or an alternative system may be installed. Installing a drainage system around the absorption fields and constructing diversions to intercept water from the higher areas reduce wetness. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed.

The main limitations on sites for local roads and streets are the wetness and a high potential for frost action. Building on raised fill material, installing a drainage system, and adding coarse grained subgrade or base material to the soil at frost depth help to overcome these limitations.

This soil is suited to cultivated crops, hay, and pasture. The wetness may interfere with farming and limits the choice of plant varieties. Proper stocking rates and restricted grazing during wet periods can help to maintain the quality of the pasture.

The potential productivity of this soil for northern red oak is moderate. The equipment limitation, seedling mortality, and the windthrow hazard are severe because of the wetness.

The capability subclass is IIIw.

RdB—Ridgebury loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and poorly drained and somewhat poorly drained. It is on the lower parts of hillsides in the uplands and along small drainageways. Individual areas are irregularly shaped or elongated and generally range from 2 to 20 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, very dark grayish brown loam

Subsoil:
8 to 16 inches, brown gravelly fine sandy loam that

has light brownish gray and dark yellowish brown mottles
16 to 26 inches, grayish brown gravelly fine sandy loam that has yellowish brown and light olive brown mottles

Substratum:
26 to 34 inches, light olive brown gravelly fine sandy loam that has grayish brown and olive yellow mottles
34 to 60 inches, olive brown gravelly loam that has brownish yellow mottles

Included with this soil in mapping are small areas of the poorly drained and very poorly drained Sun soils, areas of the well drained Paxton soils, the moderately well drained Woodbridge soils, bouldery or very stony areas, and soils that have a friable substratum. Sun soils are in depressions. Paxton and Woodbridge soils are in the higher areas. Included areas make up about 15 percent of the map unit and are generally 1 to 3 acres in size.

Soil properties—

Water table: Within a depth of 1.5 feet from November through May
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) in the surface layer and subsoil and slow or very slow (<0.02 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to slightly acid throughout the profile
Surface runoff: Medium
Erosion hazard: Slight
Depth to bedrock: More than 60 inches

Most areas of this soil are wooded or are covered by brush. A few areas are used for community development or pasture.

The main limitation on sites for dwellings with basements is wetness. Installing drains around the footings and foundations can lower the water table. Diverting runoff away from the dwellings can remove surface water.

The main limitations on sites for septic tank absorption fields are the seasonal wetness and the slow permeability in the dense substratum. Better suited soils should be selected, or an alternative system may be installed. Installing a drainage system around the absorption fields and constructing diversions to intercept water from the higher areas can help to overcome the wetness. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed.

The main limitations on sites for local roads and streets are the wetness and a high potential for frost action. Building on raised fill material, installing a drainage system, and adding coarse grained subgrade or base material to the soil at frost depth help to overcome these limitations.

This soil is suited to cultivated crops, hay, and pasture. The wetness may interfere with farming and limits the choice of plant varieties. Proper stocking rates and restricted grazing during wet periods can help to maintain the quality of the pasture.

The potential productivity of this soil for northern red oak is moderate. The equipment limitation, seedling mortality, and the windthrow hazard are severe because of the wetness.

The capability subclass is IIIw.

RgB—Ridgebury loam, 2 to 8 percent slopes, very stony. This soil is gently sloping, very deep, and poorly drained and somewhat poorly drained. It is on the lower parts of hillsides in the uplands and along small drainageways. Individual areas are irregularly shaped and generally range from 3 to 15 acres in size. Stones cover 0.1 to 3.0 percent of the surface and are 3 to 25 feet apart.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches, very dark grayish brown loam

Subsoil:
8 to 16 inches, brown gravelly fine sandy loam that has light brownish gray and dark yellowish brown mottles
16 to 26 inches, grayish brown gravelly fine sandy loam that has yellowish brown and light olive brown mottles

Substratum:
26 to 34 inches, light olive brown gravelly fine sandy loam that has grayish brown and olive yellow mottles
34 to 60 inches, olive brown gravelly loam that has brownish yellow mottles

Included with this soil in mapping are small areas of the poorly drained and very poorly drained Sun soils, areas of the moderately well drained Woodbridge soils, and bouldery areas. Sun soils are in depressions. Woodbridge soils are higher on the landscape than the Ridgebury soil. Included areas make up about 15 percent of the map unit and are generally 1 to 3 acres in size.

Soil properties—

Water table: Within a depth of 1.5 feet from November through May

Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) in the surface layer and subsoil and slow or very slow (<0.02 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to slightly acid throughout the profile
Surface runoff: Slow or medium
Erosion hazard: Slight
Depth to bedrock: More than 60 inches

Most areas of this soil are wooded or are covered by brush. A few areas are used for community development.

The main limitation on sites for dwellings with basements is wetness. Installing drains around the footings and foundations can lower the water table. Diverting runoff away from the dwellings can remove surface water.

The main limitations on sites for septic tank absorption fields are the seasonal wetness and the slow permeability in the dense substratum. Better suited soils should be selected, or an alternative system may be installed. Installing a drainage system around the absorption fields and constructing diversions to intercept water from the higher areas help to overcome the wetness. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed.

The main limitations on sites for local roads and streets are the wetness and a high potential for frost action. Building on raised fill material, installing a drainage system, and adding coarse grained subgrade or base material to the soil at frost depth help to overcome these limitations.

This soil is not suited to cultivated crops, hay, or pasture. The stones on the surface and the wetness interfere with farming and restrict the choice of plant varieties.

The potential productivity of this soil for northern red oak is moderate. The equipment limitation, seedling mortality, and the windthrow hazard are severe because of the wetness.

The capability subclass is VIIs.

RhA—Riverhead loam, 0 to 3 percent slopes. This soil is nearly level, very deep, and well drained. It is in benchlike areas along streams and on broad plains. Individual areas are broad or are long and narrow. They range from 2 to 60 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark brown loam

Subsurface layer:
6 to 14 inches, dark brown fine sandy loam

Subsoil:
14 to 25 inches, dark yellowish brown sandy loam
25 to 30 inches, yellowish brown loamy sand

Substratum:
30 to 60 inches, brown loamy sand

Included with this soil in mapping are small areas of Hinckley and Knickerbocker soils, the moderately well drained and somewhat poorly drained Pompton soils, and Charlton soils. Also included are some areas of soils that are similar to the Riverhead soil but have a more gravelly subsoil and substratum. They are near fast-flowing streams. Hinckley soils have a very gravelly subsoil and substratum. Knickerbocker soils have a sandier subsoil than the Riverhead soil. Pompton soils are along drainageways and in slight depressions. Charlton soils are adjacent to the uplands. They formed in glacial till. Some small areas are susceptible to flooding. Included areas make up about 15 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderately rapid (2.0-6.0 in/hr) in the surface layer and subsoil and very rapid (>20 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Surface runoff: Slow
Erosion hazard: Slight
Depth to bedrock: More than 60 inches

Most areas are used for community development. Some areas are mined for sand and gravel or are used for farming.

No major limitations affect the use of this soil as a site for dwellings with basements.

The main limitation on sites for septic tank absorption fields is a poor filtering capacity in the substratum. The poor filtering capacity may cause contamination of ground water by effluent. Better suited sites should be considered.

The main limitation on sites for local roads and streets is a moderate potential for frost action. Adding coarse grained base material during road construction helps to overcome this limitation.

This soil is suited to cultivated crops. Generally, the surface layer can be easily tilled throughout a wide range in moisture conditions. During droughty periods,

however, irrigation may be needed for optimum crop growth. Irrigation systems are easier and less costly to design and install in areas of this soil than in areas of the more sloping Riverhead soils.

This soil is well suited to pasture and hay. Periods of droughtiness may reduce yields, but the droughtiness generally is not a significant problem.

The potential productivity of this soil for sugar maple is moderate.

The capability subclass is IIs.

RhB—Riverhead loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and well drained. It is in benchlike areas along streams and on broad plains. Individual areas are broad or are long and narrow. They range from 2 to 60 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark brown loam

Subsurface layer:
6 to 14 inches, dark brown fine sandy loam

Subsoil:
14 to 25 inches, dark yellowish brown sandy loam
25 to 30 inches, yellowish brown loamy sand

Substratum:
30 to 60 inches, brown loamy sand

Included with this soil in mapping are small areas of Hinckley and Knickerbocker soils, the moderately well drained and somewhat poorly drained Pompton soils, and areas of Charlton soils. Also included are some areas of soils that are similar to the Riverhead soil but have a more gravelly subsoil and substratum. They are near fast-flowing streams. Hinckley soils have a very gravelly subsoil and substratum. Knickerbocker soils have a sandier subsoil than the Riverhead soil. Pompton soils are along drainageways and in slight depressions. Charlton soils are adjacent to the uplands. They formed in glacial till. Some small areas are susceptible to flooding. Included areas make up about 15 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderately rapid (2.0-6.0 in/hr) in the surface layer and subsoil and very rapid (>20 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Surface runoff: Medium
Erosion hazard: Slight
Depth to bedrock: More than 60 inches

Most areas are used for community development. Some areas are mined for sand and gravel or are used for farming.

No major limitations affect the use of this soil as a site for dwellings with basements.

The main limitation on sites for septic tank absorption fields is a poor filtering capacity in the substratum. The poor filtering capacity may cause contamination of ground water by effluent. Better suited sites should be considered.

The main limitation on sites for local roads and streets is a moderate potential for frost action. Adding coarse grained base material during road construction helps to overcome this limitation.

This soil is suited to cultivated crops. Generally, the surface layer can be easily tilled throughout a wide range in moisture conditions. During droughty periods, however, irrigation may be needed for optimum crop growth. Irrigation systems are easier and less costly to design and install in areas of this soil than in areas of the more sloping Riverhead soils.

This soil is well suited to pasture and hay. Periods of droughtiness may reduce yields, but the droughtiness generally is not a significant problem.

The potential productivity of this soil for sugar maple is moderate.

The capability subclass is IIs.

RhC—Riverhead loam, 8 to 15 percent slopes. This soil is strongly sloping, very deep, and well drained. It is on the tops and sides of terraces and plains. Individual areas are long and narrow and range from 2 to 60 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark brown loam

Subsurface layer:
6 to 14 inches, dark brown fine sandy loam

Subsoil:
14 to 25 inches, dark yellowish brown sandy loam
25 to 30 inches, yellowish brown loamy sand

Substratum:
30 to 60 inches, brown loamy sand

Included with this soil in mapping are small areas of Hinckley and Knickerbocker soils, the moderately well

drained and somewhat poorly drained Pompton soils, and areas of Charlton soils. Also included are some areas of soils that are similar to the Riverhead soil but are more gravelly throughout the subsoil and substratum. They are near fast-flowing streams. Hinckley soils are very gravelly in the subsoil and substratum. Knickerbocker soils have a sandier subsoil than the Riverhead soil. Pompton soils are along drainageways and in slight depressions. Charlton soils are adjacent to the uplands. They formed in glacial till. Some small areas are susceptible to flooding. Included areas make up about 15 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderately rapid (2.0-6.0 in/hr) in the surface layer and subsoil and very rapid (>20 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: More than 60 inches

Most areas are used for community development. Some areas are mined for sand and gravel or are used for farming.

The slope is the main limitation on sites for dwellings. Land shaping and designing the dwellings so that they conform to the natural slope of the land help to overcome this limitation.

The main limitation on sites for septic tank absorption fields is a poor filtering capacity in the substratum. The poor filtering capacity may cause contamination of ground water by effluent. Better suited sites should be considered.

The main limitations on sites for local roads and streets are the slope and a moderate potential for frost action. Adding coarse grained base material during road construction reduces the effects of frost action. Designing the roads so that they conform to the natural slope of the land helps to overcome the slope.

This soil is suited to cultivated crops. The hazard of erosion generally is moderate, but on long slopes it is severe. Contour farming or terraces and a system of conservation tillage that leaves crop residue on the surface help to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain soil tilth and increase the available water capacity.

This soil is well suited to pasture and hay. Periods of droughtiness may reduce yields, but the droughtiness generally is not a significant problem. Erosion is a hazard in overgrazed areas or during droughty periods.

The potential productivity of this soil for sugar maple is moderate.

The capability subclass is IIIe.

RhD—Riverhead loam, 15 to 25 percent slopes. This soil is moderately steep, very deep, and well drained. It is on the sides of terraces and on small hills adjacent to the uplands. Individual areas are long and narrow or rounded and range from 2 to 25 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark brown loam

Subsurface layer:
6 to 14 inches, dark brown fine sandy loam

Subsoil:
14 to 25 inches, dark yellowish brown sandy loam
25 to 30 inches, yellowish brown loamy sand

Substratum:
30 to 60 inches, brown loamy sand

Included with this soil in mapping are small areas of Hinckley and Knickerbocker soils, the moderately well drained and somewhat poorly drained Pompton soils, and some areas of Charlton soils. Hinckley soils have a very gravelly subsoil and substratum. Knickerbocker soils have a sandier subsoil than the Riverhead soil. Pompton soils are along drainageways and in slight depressions. Charlton soils are adjacent to the uplands. They formed in glacial till. Included areas make up about 15 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderately rapid (2.0-6.0 in/hr) in the surface layer and subsoil and very rapid (>20 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Surface runoff: Rapid
Depth to bedrock: More than 60 inches
Erosion hazard: Severe

Most areas are wooded. Some areas are used for community development.

The slope is the main limitation on sites for dwellings.

Land shaping and grading can help to overcome this limitation, or the dwellings can be designed so that they conform to the natural slope of the land.

The main limitations on sites for septic tank absorption fields are the slope and a poor filtering capacity in the substratum. The poor filtering capacity may cause contamination of ground water by effluent. Better suited sites, such as areas of Charlton soils on adjacent uplands, should be considered.

The main limitations on sites for local roads and streets are the slope and a moderate potential for frost action. Adding coarse grained base material during road construction reduces the effects of frost action. Designing the roads so that they conform to the natural slope of the land helps to overcome the slope.

This soil is suited to cultivated crops, but the hazard of erosion is severe. A system of conservation tillage that leaves crop residue on the surface, contour farming or terraces, and a conservation cropping system that includes one or more years of close-growing crops help to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain soil tilth and increase the available water capacity.

This soil is suited to pasture and hay. Periods of droughtiness may reduce yields. The hazard of erosion is severe, especially in overgrazed areas or during droughty periods.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation is moderate because of the slope.

The capability subclass is IVe.

RhE—Riverhead loam, 25 to 50 percent slopes. This soil is steep, very deep, and well drained. It is on the sides of terraces and on small hills adjacent to the uplands. Individual areas are long and narrow and range from 2 to 25 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark brown loam

Subsurface layer:
6 to 14 inches, dark brown fine sandy loam

Subsoil:
14 to 25 inches, dark yellowish brown sandy loam
25 to 30 inches, yellowish brown loamy sand

Substratum:
30 to 60 inches, brown loamy sand

Included with this soil in mapping are small areas of Hinckley and Knickerbocker soils, the moderately well drained and somewhat poorly drained Pompton soils, and some areas of Charlton soils. Hinckley soils have a very gravelly subsoil and substratum. Knickerbocker soils have a sandier subsoil than the Riverhead soil. Pompton soils are along drainageways and in slight depressions. Charlton soils are adjacent to the uplands. They formed in glacial till. Included areas make up about 15 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderately rapid (2.0-6.0 in/hr) in the surface layer and subsoil and very rapid (>20 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Surface runoff: Very rapid
Depth to bedrock: More than 60 inches
Erosion hazard: Very severe

Most areas are wooded. Some areas are used for community development.

The slope is the main limitation on sites for dwellings. Adjacent areas of Riverhead soils that are less sloping are better suited to this use.

The main limitations on sites for septic tank absorption fields are the slope and a poor filtering capacity in the substratum. The poor filtering capacity may cause contamination of ground water by effluent. Better suited sites are available in adjacent areas of Charlton soils.

The main limitation on sites for local roads and streets is the slope. Designing the roads so that they conform to the natural slope of the land helps to overcome this limitation.

This soil is not suited to cultivated crops because of the very severe hazard of erosion and the slope.

This soil is only poorly suited to pasture and hay. Periods of droughtiness may reduce yields. The hazard of erosion is severe, especially in overgrazed areas or during droughty periods.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation is severe because of the slope.

The capability subclass is VIe.

SbB—Stockbridge silt loam, 2 to 8 percent slopes. This soil is very deep, gently sloping, and well drained. It is on the top of broad ridges and hills. Individual areas are commonly oblong and range from 3 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 12 inches, dark brown silt loam

Subsoil:
12 to 16 inches, dark brown silt loam
16 to 36 inches, dark yellowish brown silt loam

Substratum:
36 to 60 inches, dark brown gravelly silt loam

Included with this soil in mapping are small areas of the well drained Charlton and Paxton soils, the moderately well drained Sutton soils, and the somewhat poorly drained and poorly drained Leicester and Ridgebury soils. Charlton and Paxton soils are in landscape positions similar to those of the Stockbridge soil, but they have a subsoil that is more acid. Sutton soils are on slightly concave hillsides. Leicester and Ridgebury soils are in depressions and along drainageways. Included areas make up about 15 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer and in the upper part of the subsoil and slow or moderately slow (0.06-0.6 in/hr) in the lower part of the subsoil and in the substratum
Available water capacity: High
Reaction: Strongly acid to neutral in the surface layer, moderately acid to neutral in the subsoil, and moderately acid to moderately alkaline in the substratum
Surface runoff: Slow
Depth to bedrock: More than 60 inches
Erosion hazard: Slight

Most areas of this soil are covered by brush or are wooded. Some are used for pasture, hay, or corn. A few scattered areas are used for community development.

No significant limitations affect the use of this soil as a site for dwellings with basements.

The main limitation on sites for septic tank absorption fields is the slow permeability. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed.

Roads, streets, driveways, and sidewalks are subject to a moderate potential for frost action. Adding coarse grained subgrade material at frost depth and installing a surface drainage system can reduce the effects of frost action. Quickly establishing a plant cover, mulching, and using siltation basins help to control erosion and sedimentation during construction.

This soil is well suited to cultivated crops, hay, and pasture. The hazard of erosion generally is slight, but it is more severe in overgrazed areas or on long slopes in cultivated areas. A conservation tillage system, cover crops, and rotation grazing help to control erosion.

The potential productivity of this soil for northern red oak is moderately high.

The capability subclass is IIe.

SbC—Stockbridge silt loam, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on the sides of broad ridges and hills. Individual areas are commonly oblong and range from 3 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 12 inches, dark brown silt loam

Subsoil:
12 to 16 inches, dark brown silt loam
16 to 36 inches, dark yellowish brown silt loam

Substratum:
36 to 60 inches, dark brown gravelly silt loam

Included with this soil in mapping are small areas of the well drained Charlton and Paxton soils, the moderately well drained Sutton soils, and the somewhat poorly drained and poorly drained Leicester and Ridgebury soils. Charlton and Paxton soils are in landscape positions similar to those of the Stockbridge soil, but they have a subsoil that is more acid. Sutton soils are on slightly concave hillsides. Leicester and Ridgebury soils are in depressions and along drainageways. Included areas make up about 15 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer and in the upper part of the subsoil and slow or moderately slow (0.06-0.6 in/hr) in the lower part of the subsoil and in the substratum
Available water capacity: High
Reaction: Strongly acid to neutral in the surface layer, moderately acid to neutral in the subsoil, and moderately acid to moderately alkaline in the substratum
Surface runoff: Medium

Depth to bedrock: More than 60 inches
Erosion hazard: Moderate

Most areas of this soil are covered by brush or are wooded. Some are used for pasture, hay, or corn. A few scattered areas are used for community development.

The slope is the main limitation on sites for dwellings with basements. Land shaping can help to overcome this limitation.

The main limitation on sites for septic tank absorption fields is the slow permeability. Enlarging the absorption fields or the trenches below the distribution lines will increase the rate at which the effluent is absorbed.

Roads, streets, driveways, and sidewalks are subject to a moderate potential for frost action. The slope also is a limitation. Adding coarse grained subgrade material and installing surface drains can reduce the effects of frost action. Land shaping and grading help to overcome the slope. Quickly establishing a plant cover, mulching, and using siltation basins help to control erosion and sedimentation during construction.

This soil is well suited to cultivated crops, hay, and pasture. The hazard of erosion generally is moderate, but it is severe on long slopes. Contour farming and a system of conservation tillage that leaves crop residue on the surface help to control erosion on cropland (fig. 9). Rotation grazing and weed and brush control reduce the hazard of erosion in areas used for pasture.

The potential productivity of this soil for northern red oak is moderately high.

The capability subclass is IIIe.

SbD—Stockbridge silt loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and well drained. It is on the sides of ridges and hills. Individual areas are commonly oblong and range from 3 to 20 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 12 inches, dark brown silt loam

Subsoil:
12 to 16 inches, dark brown silt loam
16 to 36 inches, dark yellowish brown silt loam

Substratum:
36 to 60 inches, dark brown gravelly silt loam

Included with this soil in mapping are small areas of the well drained Charlton and Paxton soils, the moderately well drained Sutton soils, and the somewhat poorly drained and poorly drained Leicester and Ridgebury soils. Charlton and Paxton soils are in landscape positions similar to those of the Stockbridge soil, but they have a subsoil that is more acid. Sutton soils are on slightly concave hillsides. Leicester and Ridgebury soils are in depressions and along drainageways. Included areas make up about 15 percent of the map unit and are as much as 2 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer and in the upper part of the subsoil and slow or moderately slow (0.06-0.6 in/hr) in the lower part of the subsoil and in the substratum
Available water capacity: High
Reaction: Strongly acid to neutral in the surface layer, moderately acid to neutral in the subsoil, and moderately acid to moderately alkaline in the substratum
Surface runoff: Rapid
Depth to bedrock: More than 60 inches
Erosion hazard: Severe

Most areas of this soil are covered by brush or are wooded. Some areas are used for pasture and hay. A few scattered areas are used for community development.

The slope is the main limitation on sites for dwellings with basements. Land shaping and grading can help to overcome this limitation, or the dwellings can be designed so that they conform to the natural slope of the land.

The main limitations on sites for septic tank absorption fields are the slope and the slow permeability. Enlarging the absorption fields or the trenches below the distribution lines, installing distribution lines on the contour, and adding drop boxes or other structures to ensure even distribution of effluent increase the rate at which the effluent is absorbed.

Roads, streets, driveways, and sidewalks are subject to a moderate potential for frost action. Also, the slope is a severe limitation. Adding coarse grained subgrade material and installing surface drains can reduce the effects of frost action. Land shaping and grading help to overcome the slope. Quickly establishing a plant cover, mulching, and using siltation basins help to control erosion and sedimentation during construction.

This soil is suited to cultivated crops, hay, and pasture. Erosion is a severe hazard. A system of conservation tillage that leaves crop residue on the surface, contour farming, stripcropping, terraces, and a conservation cropping system that includes several years of close-growing crops help to control erosion on cropland. Rotation grazing, applications of fertilizer, and

Figure 9.—Conservation tillage in an area of Stockbridge silt loam, 8 to 15 percent slopes.

weed and brush control reduce the hazard of erosion in areas used for pasture.

The potential productivity of this soil for northern red oak is moderately high. The hazard of erosion and the equipment limitation are moderate because of the slope.

The capability subclass is IVe.

SgC—Stockbridge-Rock outcrop complex, rolling. This unit consists of the very deep, well drained Stockbridge soil and areas of Rock outcrop. It is on landscapes where limestone bedrock is dominant. Slopes range from 5 to 15 percent. The Rock outcrop is limestone and makes up 15 to 20 percent of the map unit. Individual areas of this unit are commonly irregularly shaped and range from 2 to 25 acres in size.

The typical sequence, depth, and composition of the layers of the Stockbridge soil are as follows—

Surface layer:
0 to 12 inches, dark brown silt loam

Subsoil:
12 to 16 inches, dark brown silt loam
16 to 36 inches, dark yellowish brown silt loam

Substratum:
36 to 60 inches, dark brown gravelly silt loam

Included in mapping are small areas of the well drained Charlton and Paxton soils, the moderately well drained Sutton soils, the somewhat poorly drained and poorly drained Leicester and Ridgebury soils, the excessively drained Hinckley soils, and the well drained Riverhead soils. Charlton and Paxton soils are on hills and ridges. They have a subsoil that is more acid than that of the Stockbridge soil. Sutton soils are on slightly concave hillsides. Leicester and Ridgebury soils are in depressions and along drainageways. Hinckley and Riverhead soils are at the margins of the mapped areas on outwash plains and terraces. Included areas make up about 15 percent of the map unit and are as much as 2 acres in size.

Properties of the Stockbridge soil—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer and in the upper part of the subsoil and slow or moderately slow (0.06-0.6 in/hr) in the lower part of the subsoil and in the substratum
Available water capacity: High
Reaction: Strongly acid to neutral in the surface layer, moderately acid to neutral in the subsoil, and moderately acid to moderately alkaline in the substratum
Surface runoff: Medium
Depth to bedrock: More than 60 inches
Erosion hazard: Moderate

Most areas of this unit are covered by brush or are wooded. Some areas are used for pasture and hay.

The slope and the Rock outcrop are the main limitations on sites for dwellings with basements. Designing the dwellings so that they conform to the natural slope of the land can help to overcome the slope.

The main limitations on sites for septic tank absorption fields are the slow permeability and the Rock outcrop. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed.

Roads, streets, driveways, and sidewalks are subject to a moderate potential for frost action. Adding coarse grained subgrade material and installing surface drains reduce the effects of frost action. Quickly establishing a plant cover, mulching, and using siltation basins help to control erosion and sedimentation during construction.

This unit is not suited to cultivated crops because of the Rock outcrop. It is suited to hay and pasture. Rotation grazing, applications of fertilizer, and weed and brush control reduce the hazard of erosion in areas used for pasture.

The potential productivity of this unit for northern red oak is moderately high.

The capability subclass is VIs.

Sh—Sun loam. This soil is very deep, nearly level, and poorly drained or very poorly drained. It is in small depressions and along drainageways on till plains. Individual areas are rounded or occur as long and narrow strips about 2 to 10 acres in size. Slopes range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, very dark grayish brown loam

Subsoil:
9 to 19 inches, grayish brown loam that has strong brown and brown mottles and gray ped faces
19 to 27 inches, brown gravelly fine sandy loam that has strong brown and light brownish gray mottles

Substratum:
27 to 40 inches, brown gravelly sandy loam that has gray and strong brown mottles
40 to 61 inches, light olive brown gravelly fine sandy loam

Included with this soil in mapping are areas of the very poorly drained Palms soils, the somewhat poorly drained and poorly drained Leicester and Ridgebury soils, and stony areas or areas of soils that have a surface layer of water-deposited material. Palms soils are in the center of depressions. Leicester and Ridgebury soils commonly are in the slightly higher areas. Included areas make up about 15 percent of the map unit and are generally 1 to 2 acres in size.

Soil properties—

Water table: 1.0 foot above to 0.5 foot below the surface from November through April
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer and slow or very slow (<0.2 in/hr) in the subsoil and substratum
Reaction: Strongly acid to slightly acid in the surface layer, moderately acid to neutral in the subsoil, and slightly acid to moderately alkaline in the substratum
Surface runoff: Very slow
Depth to bedrock: More than 60 inches
Erosion hazard: None or slight

Most areas of this soil are wooded or are covered by brush.

Wetness is the main limitation on sites for dwellings with basements. Better suited sites that are higher on

the landscape should be selected.

The main limitations on sites for septic tank absorption fields are the wetness and the slow rate of water movement in the substratum. Better suited sites should be selected, or a specially designed alternative system may be installed. Installing a drainage system around the absorption fields and constructing diversions to intercept water from the higher areas help to overcome the wetness. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed.

The main limitations on sites for local roads and streets are the wetness and a high potential for frost action. Building on raised fill material, installing a drainage system, and adding coarse grained subgrade or base material to the soil at frost depth help to overcome these limitations.

If drained, this soil is suited to cultivated crops. It also is suited to hay and pasture. The wetness limits the selection of forage crops that can be grown and interferes with farming. Proper stocking rates and restricted grazing during wet periods help to maintain the quality of the pasture.

The potential productivity of this soil for red maple is moderate. The equipment limitation, seedling mortality, and the windthrow hazard are severe because of the wetness.

The capability subclass is IVw.

Sm—Sun loam, extremely stony. This soil is very deep, nearly level, and poorly drained or very poorly drained. It is in small depressions and along drainageways on till plains. Stones larger than 10 inches in diameter cover 3 to 15 percent of the surface and are 1.5 to 3.0 feet apart. Individual areas are rounded or occur as long and narrow strips about 2 to 10 acres in size. Slopes range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches, very dark grayish brown loam

Subsoil:
9 to 19 inches, grayish brown loam that has strong brown and brown mottles and gray ped faces
19 to 27 inches, brown gravelly fine sandy loam that has strong brown and light brownish gray mottles

Substratum:
27 to 40 inches, brown gravelly sandy loam that has gray and strong brown mottles
40 to 61 inches, light olive brown gravelly fine sandy loam

Included with this soil in mapping are areas of the very poorly drained Palms soils and the somewhat poorly drained and poorly drained Leicester and Ridgebury soils. Palms soils are in the center of depressions. Leicester and Ridgebury soils commonly are in the slightly higher areas. Also included are areas that are not stony or areas of soils that have a surface layer of water-deposited material. Included areas make up about 15 percent of the map unit and are generally 1 to 2 acres in size.

Soil properties—

Water table: 1.0 foot above to 0.5 foot below the surface from November through April
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer and slow or very slow (<0.2) in the subsoil and substratum
Reaction: Strongly acid to slightly acid in the surface layer, moderately acid to neutral in the subsoil, and slightly acid to moderately alkaline in the substratum
Surface runoff: Very slow
Depth to bedrock: More than 60 inches
Erosion hazard: None or slight

Most areas of this soil are wooded or are covered by brush.

Wetness is the main limitation on sites for dwellings with basements. Better suited sites that are higher on the landscape should be selected.

The main limitations on sites for septic tank absorption fields are the wetness and the slow rate of water movement in the substratum. Better suited sites should be selected, or a specially designed alternative system may be installed. Installing a drainage system around the absorption fields and constructing diversions to intercept water from the higher areas help to overcome the wetness. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed.

The main limitations on sites for local roads and streets are the wetness and a high potential for frost action. Building on raised fill material, installing a drainage system, and adding coarse grained subgrade or base material to the soil at frost depth help to overcome these limitations.

This soil is not suited to cultivated crops or to hay and pasture because of the surface stones and prolonged periods of wetness.

The potential productivity of this soil for red maple is moderate. The equipment limitation is severe because of the wetness. The seedling mortality rate and the windthrow hazard are also concerns.

The capability subclass is VIIs.

SuA—Sutton loam, 0 to 3 percent slopes. This soil is nearly level, very deep, and moderately well drained. It is on concave foot slopes and along drainageways in the uplands. Individual areas are oblong or irregularly shaped and range from 3 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, dark brown loam

Subsurface layer:
2 to 9 inches, dark brown loam

Subsoil:
9 to 17 inches, dark brown gravelly loam
17 to 26 inches, dark yellowish brown gravelly fine sandy loam that has light brownish gray and strong brown mottles

Substratum:
26 to 38 inches, dark grayish brown gravelly sandy loam that has strong brown mottles
38 to 60 inches, dark brown gravelly fine sandy loam that has strong brown mottles

Included with this soil in mapping are small areas of the well drained Charlton soils, the somewhat poorly drained and poorly drained Leicester soils, and Woodbridge soils. Charlton soils are on knobs and hills. Leicester soils are in depressions and near drainageways. Woodbridge soils are in landscape positions similar to those of the Sutton soil. They have a dense substratum. Also included are areas of rock outcrop and areas of Sutton soils that have a very stony surface. Included areas make up about 15 percent of the map unit and range from 0.25 acre to 2.0 acres in size.

Soil properties—

Water table: 1.5 to 2.5 feet below the surface from November through April
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: High
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Slow
Depth to bedrock: More than 60 inches
Erosion hazard: Slight

Most areas are used for urban development or are wooded. Some areas are covered by brush or are open fields.

The seasonal high water table is the main limitation on sites for dwellings with basements. Installing foundation drains, sealing the foundation, and diverting runoff away from the buildings reduce wetness.

The wetness is a limitation on sites for septic tank absorption fields. It can be reduced by installing a drainage system around the absorption fields and constructing diversions to intercept runoff from the higher areas.

The wetness and the potential for frost action are limitations on sites for local roads and streets. Installing a drainage system and adding coarse grained subgrade or base material to the soil at frost depth help to overcome these limitations.

This soil is suited to cultivated crops, but the wetness may hinder some farming activities. Erosion is a slight hazard. Species that are tolerant of some seasonal wetness should be selected for planting. A conservation tillage system that leaves crop residue on the surface can help to control erosion.

This soil is well suited to pasture and hay. Overgrazing and grazing when the soil is wet are the main management concerns.

The potential productivity of this soil for sugar maple is moderate.

The capability subclass is IIw.

SuB—Sutton loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and moderately well drained. It is on concave foot slopes and along drainageways in the uplands. Individual areas are oblong or irregularly shaped and range from 3 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, dark brown loam

Subsurface layer:
2 to 9 inches, dark brown loam

Subsoil:
9 to 17 inches, dark brown gravelly loam
17 to 26 inches, dark yellowish brown gravelly fine sandy loam that has light brownish gray and strong brown mottles

Substratum:
26 to 38 inches, dark grayish brown gravelly sandy loam that has strong brown mottles
38 to 60 inches, dark brown gravelly fine sandy loam that has strong brown mottles

Included with this soil in mapping are small areas of the well drained Charlton soils, the somewhat poorly drained and poorly drained Leicester soils, and Woodbridge soils. Charlton soils are on knobs and hills. Leicester soils are in depressions and near drainageways. Woodbridge soils are in landscape

positions similar to those of the Sutton soil. They have a dense substratum. Also included are areas of rock outcrop and areas of Sutton soils that have a very stony surface. Included areas make up about 15 percent of the map unit and are 0.25 acre to 2.0 acres in size.

Soil properties—

Water table: 1.5 to 2.5 feet below the surface from November through April
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: High
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Depth to bedrock: More than 60 inches
Erosion hazard: Moderate

Most areas are used for urban development or are forested. Some areas are covered by brush or are open fields.

The seasonal high water table is the main limitation on sites for dwellings with basements. Installing foundation drains, sealing the foundation, and diverting runoff away from the buildings help to overcome this limitation.

The wetness is a limitation on sites for septic tank absorption fields. It can be reduced by installing a drainage system around the absorption fields and constructing diversions to intercept runoff from the higher areas.

The wetness and the potential for frost action are limitations on sites for local roads and streets. Installing a drainage system and adding coarse grained subgrade or base material to the soil at frost depth help to overcome these limitations.

This soil is suited to cultivated crops, but the wetness may hinder some farming activities. Erosion is a moderate hazard. Species that are tolerant of some seasonal wetness should be selected for planting. A conservation tillage system that leaves crop residue on the surface, contour farming, stripcropping, and terraces help to control erosion.

This soil is well suited to pasture and hay. Overgrazing and grazing when the soil is wet are the main management concerns.

The potential productivity of this soil for sugar maple is moderate.

The capability subclass is IIe.

Ub—Udorthents, smoothed. This unit consists of very deep, excessively drained to moderately well drained soils that have been altered by cutting and filling. It is mainly in and adjacent to urban areas, highways, and borrow areas. It is made up of soil material in alternating layers ranging from sand to silt loam. Individual areas are commonly rectangular and range from 5 to 100 acres in size. Slopes are mainly 3 to 15 percent, but they range from 0 to 25 percent. The steeper slopes are at the edges of the mapped areas.

Because of the variability of the Udorthents, a typical pedon is not described. The fill material is commonly more than 20 inches deep over the original soil. The content of rock fragments ranges from 0 to 60 percent.

Included with this unit in mapping are small areas of Udorthents that have a wet substratum, areas of urban land, areas of rock outcrop, and areas of undisturbed soils, such as Riverhead, Charlton, Hollis, Leicester, and Sun soils. The rock outcrop is mainly in areas that have been cut. The undisturbed soils are in small areas adjacent to the unit and in areas within the unit where the fill material is very thin. The Udorthents having a wet substratum are in areas that have been filled but that were formerly somewhat poorly drained to very poorly drained. Included areas are as much as 3 acres in size and make up 15 to 25 percent of the map unit.

The properties and characteristics of the Udorthents are so variable that onsite investigation and evaluation are required to determine the suitability and limitations for proposed uses.

A capability subclass is not assigned.

Uc—Udorthents, wet substratum. This unit consists of somewhat poorly drained and very poorly drained soils that have been altered mainly by filling. Filled areas are in the lower landscape positions, such as depressions, drainageways, and areas of tidal marsh. The fill material ranges in texture from sand to silt loam. Individual areas of this unit are commonly rectangular and range in size from 5 to 50 acres in size. Slopes are dominantly 0 to 3 percent, but they range from 0 to 15 percent.

Because of the variability of the Udorthents, a typical pedon is not described. Fill material is usually more than 20 inches deep over the original soil material. The buried soils range from loamy or sandy mineral material to organic deposits. The fill material includes manufactured materials in some places.

Included with this unit in mapping are small areas of Udorthents that are better drained, areas of urban land, areas of rock outcrop, and areas of undisturbed soils, such as Hinckley, Paxton, Ipswich, Fredon, and Raynham soils. The urban land is in areas of residential or commercial development. The rock outcrop is in areas where the soil has been removed. The undisturbed soils are adjacent to the fill areas and in areas where the fill is very thin. Included areas are as

much as 3 acres in size and make up about 20 percent of the map unit.

The properties and characteristics of the Udorthents are so variable that onsite investigation and evaluation are required to determine the suitability and limitations for proposed uses.

A capability subclass is not assigned.

UdB—Unadilla silt loam, 2 to 6 percent slopes. This soil is gently sloping, very deep, and well drained. It is on stream terraces along valleys. Individual areas are mostly long and narrow and range from about 2 to 10 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown silt loam

Subsurface layer:
2 to 7 inches, dark brown silt loam
7 to 13 inches, brown very fine sandy loam

Subsoil:
13 to 28 inches, dark yellowish brown very fine sandy loam
28 to 32 inches, light olive brown very fine sandy loam

Substratum:
32 to 60 inches, yellowish brown very fine sandy loam that has light olive brown mottles

Included with this soil in mapping are areas of the moderately well drained Pompton soils, areas of Riverhead and Knickerbocker soils, and areas of soils that are similar to the Unadilla soil but are moderately well drained. Pompton soils are in the more level areas. Riverhead and Knickerbocker soils are more gravelly or more sandy than the Unadilla soil. They commonly are in the higher positions on the landscape. Included areas make up about 15 percent of the map unit and are 0.25 acre to 2.0 acres in size.

Soil properties—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer, subsurface layer, and subsoil and moderately rapid or rapid (2.0-20 in/hr) in the substratum
Available water capacity: High
Reaction: Very strongly acid to moderately acid in the surface layer, subsurface layer, and subsoil and strongly acid to mildly alkaline in the substratum
Surface runoff: Medium
Depth to bedrock: More than 60 inches
Erosion hazard: Moderate

Areas of this soil are used for community development, farming, or recreation, or they are forested or covered by brush and nonwoody plants.

No major limitations affect the use of this soil as a site for dwellings with basements or for septic tank absorption fields. Erosion is a hazard during construction. Temporary erosion-control structures should be used during construction.

Local roads and streets are subject to a high potential for frost action. Replacing the upper layers of this soil with more suitable base material can reduce the damage caused by frost heave.

This soil is well suited to crops, hay, and pasture. It can be easily tilled and can be farmed intensively if well managed. Erosion is the main hazard. Contour farming and a system of conservation tillage can help to control erosion. Using cover crops and returning crop residue to the soil can help to maintain soil tilth and increase the rate of water infiltration. Proper stocking rates, rotation grazing, and restricted grazing during very wet periods help to prevent surface compaction and deterioration of the sod cover and help to control erosion.

The potential productivity of this soil for sugar maple is moderate.

The capability subclass is IIe.

Uf—Urban land. This unit consists of areas where at least 60 percent of the land surface is covered with buildings or other structures. The areas include parking lots, shopping centers, industrial parks, and institutional sites. Much of the Urban land is in the business centers of villages and cities. Most areas are long and narrow or are rectangular. The long and narrow areas are mainly along highways. Individual areas of this unit range from 5 to 600 acres in size. Slopes range from 0 to 8 percent.

Included in mapping are small areas of soils that have not been appreciably altered, such as Riverhead, Chatfield, Sutton, and Unadilla soils. The undisturbed soils are in areas between buildings or other structures. Also included are areas of Udorthents in disturbed areas that are not covered by buildings or other structures. Included areas make up 5 to 20 percent of the map unit.

Reclamation is required if Urban land is converted from its present use. The areas of included soils that are not covered by structures are suitable for uses that are compatible with Urban land.

A capability subclass is not assigned.

UhB—Urban land-Charlton complex, 2 to 8 percent slopes. This unit consists of areas of Urban land and the very deep, well drained, and gently sloping Charlton

soil. It is on ridges and hilltops that are underlain by folded bedrock. Individual areas are irregularly shaped or rectangular and range from 5 to 100 acres in size. They are about 50 percent Urban land, 25 percent Charlton soil, and 25 percent other soils.

Typically, the Urban land consists of areas covered by buildings, streets, parking lots, and other structures that make it impossible to identify the soils. The natural soil layers have been altered or mixed with manufactured materials, such as bricks, broken concrete, or cinders.

The typical sequence, depth, and composition of the layers of the Charlton soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam

Included in mapping are small areas of the very deep, moderately well drained Sutton soils; the somewhat poorly drained and poorly drained Leicester soils; the poorly drained and very poorly drained Sun soils; soils that have bedrock at a depth of 40 to 60 inches; areas of the moderately deep Chatfield soils; and small areas of the shallow Hollis soils. Sun soils are along drainageways and between ridges. Chatfield soils are on hilltops. Hollis soils are on ridgetops. Also included are areas of Udorthents adjacent to buildings and other structures. Included areas are as much as 2 acres in size.

Properties of the Charlton soil—

Water table: At a depth of more than 60 inches
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Depth to bedrock: More than 60 inches
Erosion hazard: Severe during construction

This unit is used mainly for urban development. The open areas are lawns, gardens, or vacant and wooded land between structures.

No major limitations affect the use of the Charlton soil as a site for dwellings, for local roads and streets, or for septic tank absorption fields. Erosion is a hazard during construction. Temporary erosion-control structures should be used.

A capability subclass is not assigned.

UhC—Urban land-Charlton complex, 8 to 15 percent slopes. This unit consists of areas of Urban land and the very deep, well drained Charlton soil. It is on ridges and hilltops that are underlain by folded bedrock. Individual areas are irregularly shaped or rectangular and range from 5 to 100 acres in size. They are about 40 percent Urban land, 35 percent Charlton soil, and 25 percent other soils.

Typically, the Urban land consists of areas covered by buildings, streets, parking lots, and other structures that make it impossible to identify the soils (fig. 10). The natural soil layers have been altered or mixed with manufactured materials, such as bricks, broken concrete, or cinders.

The typical sequence, depth, and composition of the layers of the Charlton soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam

Included in mapping are small areas of the very deep, moderately well drained Sutton soils; the somewhat poorly drained and poorly drained Leicester soils; the poorly drained and very poorly drained Sun soils; soils that have bedrock at a depth of 40 to 60 inches; areas of the moderately deep Chatfield soils; and small areas of the shallow Hollis soils. Sun soils are along drainageways and between ridges. Chatfield soils are on hilltops. Hollis soils are on ridgetops. Also included are areas of Udorthents adjacent to buildings and other structures. Included areas are as much as 2 acres in size.

Properties of the Charlton soil—

Water table: At a depth of more than 60 inches
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Depth to bedrock: More than 60 inches
Erosion hazard: Severe during construction

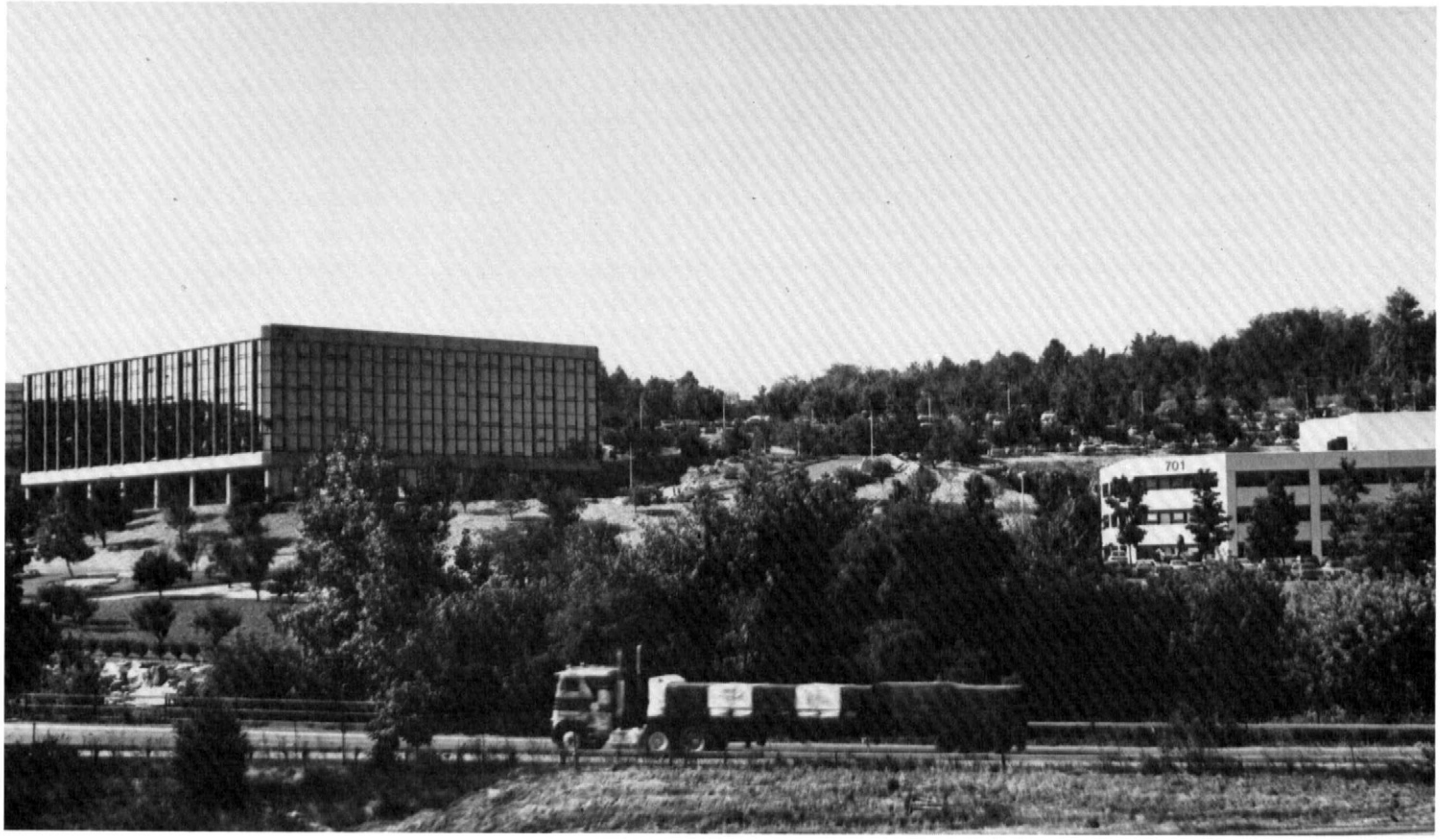

Figure 10.—Industrial and commercial development in an area of Urban land-Charlton complex, 8 to 15 percent slopes, in White Plains.

This unit is used mainly for urban development. The open areas are lawns, gardens, or vacant and wooded land between structures.

The main limitation on sites for dwellings with basements is the slope. Land shaping and grading help to overcome this limitation, or the buildings can be designed so that they conform to the natural slope of the land.

The main limitation on sites for septic tank absorption fields is the slope. Installing distribution lines on the contour increases the rate at which the effluent is absorbed.

The slope is the main limitation on sites for local roads and streets. Land shaping and grading help to overcome this limitation.

A capability subclass is not assigned.

UhD—Urban land-Charlton complex, 15 to 25 percent slopes. This unit consists of areas of Urban land and the very deep, well drained, moderately steep Charlton soil. It is on ridges and hilltops that are underlain by folded bedrock. Individual areas are irregularly shaped or rectangular and range from 5 to 50 acres in size. They are about 40 percent Urban land, 35 percent Charlton soil, and 25 percent other soils.

Typically, the Urban land consists of areas covered by buildings, streets, parking lots, and other structures that make it impossible to identify the soils. The natural soil layers have been altered or mixed with manufactured materials, such as bricks, broken concrete, or cinders.

The typical sequence, depth, and composition of the layers of the Charlton soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam

Included in mapping are small areas of the very deep, moderately well drained Sutton soils; the

somewhat poorly drained and poorly drained Leicester soils; the poorly drained and very poorly drained Sun soils; soils that have bedrock at a depth of 40 to 60 inches; areas of the moderately deep Chatfield soils; and small areas of the shallow Hollis soils. Sun soils are along drainageways and between ridges. Chatfield soils are on hilltops. Hollis soils are on ridgetops. Also included are areas of Udorthents adjacent to buildings and other structures. Included areas are as much as 2 acres in size.

Properties of the Charlton soil—

Water table: At a depth of more than 60 inches
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Very rapid
Depth to bedrock: More than 60 inches
Erosion hazard: Very severe during construction

This unit is used mainly for urban development. The open areas are lawns, gardens, or vacant and wooded land between structures.

The slope is the main limitation on sites for dwellings, for local roads and streets, or for septic tank absorption fields. Charlton soils in the less sloping areas are better suited to these uses.

A capability subclass is not assigned.

UIC—Urban land-Charlton-Chatfield complex, rolling, very rocky. This unit consists of Urban land; the very deep, well drained Charlton soil; and the moderately deep, well drained or somewhat excessively drained Chatfield soil. It is on ridges and hilltops that are underlain by folded bedrock. Slopes range from 2 to 15 percent. Individual areas are irregularly shaped or rectangular and range from 5 to 100 acres in size. They are about 40 percent Urban land, 20 percent Charlton soil, 15 percent Chatfield soil, and 25 percent other soils and rock outcrop. Exposed bedrock covers 0.1 to 10.0 percent of the surface.

Typically, the Urban land consists of areas covered by buildings, streets, parking lots, and other structures. The natural soil layers have been altered or mixed with manufactured materials, such as bricks, broken concrete, or cinders.

The typical sequence, depth, and composition of the layers of the Charlton soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam

The typical sequence, depth, and composition of the layers of the Chatfield soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 7 inches, dark brown loam

Subsoil:
7 to 24 inches, brown flaggy loam

Bedrock:
24 inches, fractured granitic bedrock

Included in mapping are small areas of the very deep, moderately well drained Sutton soils; the somewhat poorly drained and poorly drained Leicester soils; the poorly drained and very poorly drained Sun soils; soils that have bedrock at a depth of 40 to 60 inches; a few areas of the very poorly drained Palms soils; and small areas of the shallow Hollis soils. Sun soils are along drainageways and between ridges. Palms soils are in low depressions. Hollis soils are on ridgetops. In many areas the surface layer of the Charlton and Chatfield soils has been cut and filled. Included areas are as much as 2 acres in size.

Properties of the Charlton soil—

Water table: At a depth of more than 60 inches
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Depth to bedrock: More than 60 inches
Erosion hazard: Severe during construction

Properties of the Chatfield soil—

Water table: At a depth of more than 60 inches; may occur at the interface with bedrock for a short period during the spring
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Low
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Depth to bedrock: 20 to 40 inches
Erosion hazard: Severe during construction

This unit is used mainly for urban development. The open areas are lawns, gardens, or vacant and wooded land between structures.

The main limitation on sites for dwellings with basements is the moderate depth to bedrock in the Chatfield soil. The dwellings can be built above the areas of rock outcrop and landscaped with additional fill. Selecting building sites in areas of the Charlton soil can minimize the need for grading or filling or for removing rock. The slope is an additional limitation in the steeper areas. Land shaping and grading can help to overcome this limitation, or the buildings can be designed so that they conform to the natural slope of the land.

The main limitation on sites for septic tank absorption fields is the moderate depth to bedrock in the Chatfield soil. Establishing the absorption fields in areas of the deeper Charlton soil can help to overcome this limitation.

The variable depth to bedrock is the main limitation on sites for local roads and streets. Avoiding the areas of rock outcrop when the roads are constructed and grading can minimize the need for rock removal. In strongly sloping or uneven areas, some land shaping and grading may be needed. The potential for frost action is an additional limitation in the Chatfield soil. Adding coarse grained subgrade or base material helps to prevent the damage caused by frost heave.

A capability subclass is not assigned.

UID—Urban land-Charlton-Chatfield complex, hilly, very rocky. This unit consists of Urban land; the very deep, well drained Charlton soil; and the moderately deep, well drained or somewhat excessively drained Chatfield soil. It is on ridges and hilltops that are underlain by folded bedrock. Slopes range from 15 to 35 percent. Individual areas are irregularly shaped or long and narrow and range from 5 to 50 acres in size. They are about 50 percent Urban land, 20 percent Charlton soil, 10 percent Chatfield soil, and 20 percent other soils and rock outcrop. Exposed bedrock covers 0.1 to 10.0 percent of the surface.

Typically, the Urban land consists of areas covered by buildings, streets, parking lots, and other structures. The natural soil layers have been altered or mixed with manufactured materials, such as bricks, broken concrete, or cinders.

The typical sequence, depth, and composition of the layers of the Charlton soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 8 inches, dark brown loam

Subsoil:
8 to 24 inches, dark yellowish brown sandy loam

Substratum:
24 to 60 inches, dark grayish brown sandy loam

The typical sequence, depth, and composition of the layers of the Chatfield soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 7 inches, dark brown loam

Subsoil:
7 to 24 inches, brown flaggy loam

Bedrock:
24 inches, fractured granitic bedrock

Included in mapping are small areas of the very deep, moderately well drained Sutton soils; the somewhat poorly drained and poorly drained Leicester soils; the poorly drained and very poorly drained Sun soils; soils that have bedrock at a depth of 40 to 60 inches; and small areas of the shallow Hollis soils. Sun soils are along drainageways and between ridges. Hollis soils are on ridgetops. In many places the surface layer of the Charlton and Chatfield soils has been cut and filled. Included areas are as much as 2 acres in size.

Properties of the Charlton soil—

Water table: At a depth of more than 60 inches throughout the year
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Very rapid
Depth to bedrock: More than 60 inches
Erosion hazard: Very severe during construction

Properties of the Chatfield soil—

Water table: At a depth of more than 60 inches; may occur at the interface with bedrock for a short period during the spring
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Low
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Very rapid
Depth to bedrock: 20 to 40 inches
Erosion hazard: Very severe during construction

This unit is used mainly for residential and commercial development. The open areas are lawns, gardens, or vacant and wooded land between structures.

The main limitations on sites for dwellings with basements are the moderate depth to bedrock in the Chatfield soil and the hilly, uneven slopes. The dwellings can be built above the areas of rock outcrop and landscaped with additional fill. Selecting building sites in areas of the Charlton soil can minimize the need for grading or filling or for removing rock. Land shaping and grading can help to overcome the slope, or the buildings can be designed so that they conform to the natural slope of the land.

The main limitations on sites for septic tank absorption fields are the moderate depth to bedrock in the Chatfield soil and the hilly, uneven slopes. The less sloping included areas are better suited to this use.

The variable depth to bedrock and the hilly, uneven slopes are the main limitations on sites for local roads and streets. Avoiding the areas of rock outcrop when the roads are constructed and grading can minimize the need for rock removal. Land shaping and grading can help to overcome the slope. The potential for frost action is an additional limitation in areas of the Chatfield soil. Adding coarse grained subgrade or base material helps to prevent the damage caused by frost heave.

A capability subclass is not assigned.

UmC—Urban land-Chatfield-Rock outcrop complex, rolling. This unit consists of Urban land; the moderately deep, well drained and somewhat excessively drained Chatfield soil; and areas of Rock outcrop. It is on ridges and hilltops that are underlain by folded bedrock. Slopes range from 2 to 15 percent. Individual areas are irregularly shaped or rectangular and range from 5 to 100 acres in size. They are about 50 percent Urban land, 20 percent Chatfield soil, 15 percent Rock outcrop, and 15 percent other soils.

Typically, the Urban land consists of areas covered by buildings, streets, parking lots, and other structures. The natural soil layers have been altered or mixed with manufactured materials, such as bricks, broken concrete, or cinders.

The areas of Rock outcrop consist of exposures of massive granite. They are on the tops of hills and on some side slopes. The rolling landscape is characterized by uneven hills and valleys. Some areas have a stairstep appearance.

The typical sequence, depth, and composition of the layers of the Chatfield soil are as follows—

Surface layer:
0 to 2 inches, very dark grayish brown loam

Subsurface layer:
2 to 7 inches, dark brown loam

Subsoil:
7 to 24 inches, brown flaggy loam

Bedrock:
24 inches, fractured granitic bedrock

Included in mapping are small areas of the very deep and moderately well drained Sutton soils, the somewhat poorly drained and poorly drained Leicester soils, the poorly drained and very poorly drained Sun soils, soils that have bedrock at a depth of 40 to 60 inches, areas of Charlton soils, and small areas of the shallow Hollis soils. Sun soils are along drainageways and between ridges. Charlton soils are on the sides of the hills. Hollis soils are on ridgetops. Also included are areas of Udorthents adjacent to buildings and other structures. Included areas are as much as 2 acres in size.

Properties of the Chatfield soil—

Water table: At a depth of more than 60 inches; may occur at the interface with bedrock for a short period during the spring
Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) throughout the profile
Available water capacity: Low
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Depth to bedrock: 20 to 40 inches
Erosion hazard: Severe during construction

This unit is used mainly for urban development. The open areas are lawns, gardens, or vacant and wooded land between structures.

The main limitations on sites for dwellings with basements are the moderate depth to bedrock in the Chatfield soil, the Rock outcrop, and the irregular topography. The dwellings can be built above the areas of Rock outcrop and landscaped with additional fill. Selecting building sites in areas of the included Charlton soils can minimize the need for grading or filling or for removing rock. Land shaping and grading help to overcome the slope, or the buildings can be designed so that they conform to the natural slope of the land.

The main limitation on sites for septic tank absorption fields is the moderate depth to bedrock in the Chatfield soil. Selecting sites in areas of the deeper included Charlton soils can help to overcome this limitation.

The moderate depth to bedrock in the Chatfield soil is the main limitation on sites for local roads and streets. Avoiding the areas of Rock outcrop when the roads are constructed and grading can minimize the

need for rock removal. In strongly sloping or uneven areas, some land shaping and grading may be needed. The potential for frost action is an additional limitation in areas of the Chatfield soil. Adding coarse grained subgrade or base material helps to prevent the damage caused by frost heave.

A capability subclass is not assigned.

UpB—Urban land-Paxton complex, 2 to 8 percent slopes. This unit consists of areas of Urban land and the very deep, well drained, gently sloping Paxton soil. It is on ridges and hilltops that are underlain by folded bedrock. Individual areas are irregularly shaped or rectangular and range from 5 to 100 acres in size. They are about 50 percent Urban land, 25 percent Paxton soil, and 25 percent other soils.

Typically, the Urban land consists of areas covered by buildings, streets, parking lots, and other structures. The natural soil layers have been altered or mixed with manufactured materials, such as bricks, broken concrete, or cinders.

The typical sequence, depth, and composition of the layers of the Paxton soil are as follows—

Surface layer:
0 to 10 inches, dark brown fine sandy loam

Subsoil:
10 to 17 inches, dark yellowish brown loam
17 to 20 inches, olive brown sandy loam

Substratum:
20 to 25 inches, olive brown, firm sandy loam
25 to 60 inches, dark grayish brown, very firm gravelly sandy loam

Included in mapping are small areas of the very deep and moderately well drained Woodbridge soils, the somewhat poorly drained and poorly drained Ridgebury soils, the poorly drained and very poorly drained Sun soils, soils that have bedrock at a depth of 40 to 60 inches, areas of Charlton soils, and small areas of the shallow Hollis soils. Sun soils are along drainageways and between ridges. Charlton soils are on hills where the till is not dense and compact. Hollis soils are on ridgetops. Also included are areas of Udorthents adjacent to buildings and other structures. Included areas make up about 25 percent of the map unit and are as much as 2 acres in size.

Properties of the Paxton soil—

Water table: Perched above the dense substratum at a depth of 1.5 to 2.5 feet from February through April
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer and subsoil and slow or very slow (<0.2 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: More than 60 inches

This unit is used mainly for urban development. The open areas are lawns, gardens, or vacant and wooded land between structures.

The main limitation on sites for dwellings with basements is seasonal wetness. The wetness can be reduced by installing drains around the footings, sealing the foundation, and land shaping to divert surface water away from the buildings.

The main limitation on sites for septic tank absorption fields is the slow or very slow permeability in the substratum. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed.

The main limitations on sites for local roads and streets are the wetness and frost action. Constructing the roads on raised fill of coarse grained material helps to overcome these limitations.

A capability subclass is not assigned.

UpC—Urban land-Paxton complex, 8 to 15 percent slopes. This unit consists of areas of Urban land and the very deep, well drained, strongly sloping Paxton soil. It is on ridges and hilltops that are underlain by folded bedrock. Individual areas are irregularly shaped or rectangular and range from 5 to 75 acres in size. They are about 40 percent Urban land, 35 percent Paxton soil, and 25 percent other soils.

Typically, the Urban land consists of areas covered by buildings, streets, parking lots, and other structures. The natural soil layers have been altered or mixed with manufactured materials, such as bricks, broken concrete, or cinders.

The typical sequence, depth, and composition of the layers of the Paxton soil are as follows—

Surface layer:
0 to 10 inches, dark brown fine sandy loam

Subsoil:
10 to 17 inches, dark yellowish brown loam
17 to 20 inches, olive brown sandy loam

Substratum:
20 to 25 inches, olive brown, firm sandy loam
25 to 60 inches, dark grayish brown, very firm gravelly sandy loam

Included in mapping are small areas of the very deep and moderately well drained Woodbridge soils, the somewhat poorly drained and poorly drained Ridgebury

soils, the poorly drained and very poorly drained Sun soils, soils that have bedrock at a depth of 40 to 60 inches, areas of rock outcrop, areas of Charlton soils, and small areas of the shallow Hollis soils and the moderately deep Chatfield soils. Sun soils are along drainageways and between ridges. Charlton soils are on hills where the till is not dense and compact. Hollis and Chatfield soils are on ridgetops. Also included are areas of Udorthents adjacent to buildings and other structures. Included areas make up about 25 percent of the map unit and are as much as 2 acres in size.

Properties of the Paxton soil—

Water table: Perched above the dense substratum at a depth of 1.5 to 2.5 feet from February through April
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer and subsoil and slow or very slow (<0.2 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Erosion hazard: Severe
Depth to bedrock: More than 60 inches

This unit is used mainly for urban development. The open areas are lawns, gardens, or vacant and wooded land between structures.

The main limitations on sites for dwellings with basements are the slope and seasonal wetness. Land shaping and designing the structures so that they conform to the natural slope of the land can help to overcome the slope. The wetness can be reduced by installing drains around the footings, sealing the foundation, and land shaping to divert surface water away from the buildings.

The main limitation on sites for septic tank absorption fields is the slow or very slow permeability in the substratum. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed.

The main limitations on sites for local roads and streets are the wetness and frost action. Constructing the roads on raised fill of coarse grained material helps to overcome these limitations.

A capability subclass is not assigned.

UpD—Urban land-Paxton complex, 15 to 25 percent slopes. This unit consists of areas of Urban land and the very deep, well drained, moderately steep Paxton soil. It is on ridges and hilltops that are underlain by folded bedrock. Individual areas are irregularly shaped or long and narrow and range from 5 to 50 acres in size. They are about 40 percent Urban land, 35 percent Paxton soil, and 25 percent other soils.

Typically, the Urban land consists of areas covered by buildings, streets, parking lots, and other structures. The natural soil layers have been altered or mixed with manufactured materials, such as bricks, broken concrete, or cinders.

The typical sequence, depth, and composition of the layers of the Paxton soil are as follows—

Surface layer:
0 to 10 inches, dark brown fine sandy loam

Subsoil:
10 to 17 inches, dark yellowish brown loam
17 to 20 inches, olive brown sandy loam

Substratum:
20 to 25 inches, olive brown, firm sandy loam
25 to 60 inches, dark grayish brown, very firm gravelly sandy loam

Included in mapping are small areas of the very deep and moderately well drained Woodbridge soils, the somewhat poorly drained and poorly drained Ridgebury soils, the poorly drained and very poorly drained Sun soils, soils that have bedrock at a depth of 40 to 60 inches, areas of rock outcrop, Charlton soils, and small areas of the shallow Hollis soils and the moderately deep Chatfield soils. Sun soils are along drainageways and between ridges. Charlton soils are on hills where the till is not dense and compact. Hollis soils and Chatfield soils are on ridgetops. Also included are areas of Udorthents adjacent to buildings and other structures. Included areas make up about 25 percent of the map unit and are as much as 2 acres in size.

Properties of the Paxton soil—

Water table: Perched above the dense substratum at a depth of 1.5 to 2.5 feet from February through April
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer and subsoil and slow or very slow (<0.2 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Very rapid
Erosion hazard: Very severe
Depth to bedrock: More than 60 inches

This unit is used mainly for urban development. The open areas are lawns, gardens, or vacant and wooded land between structures.

The main limitation on sites for dwellings with basements is the slope. Land shaping and designing the structures so that they conform to the natural slope of the land help to overcome this limitation. The seasonal wetness also is a limitation. It can be reduced by installing drains around the footings, sealing the

foundation, and land shaping to divert surface water away from the buildings.

The main limitations on sites for septic tank absorption fields are the slope and the slow or very slow permeability in the substratum. More suitable sites should be selected, or a specially designed system can be installed.

The main limitation on sites for local roads and streets is the slope. Constructing the roads on the contour and land shaping and grading help to overcome this limitation.

A capability subclass is not assigned.

UrB—Urban land-Ridgebury complex, 1 to 8 percent slopes. This unit consists of areas of Urban land and the gently sloping, very deep, poorly drained and somewhat poorly drained Ridgebury soil. It is on the lower parts of hillsides in the uplands and along small drainageways. Individual areas are irregularly shaped or blocky and generally range from 5 to 75 acres in size. They are about 60 percent Urban land, 25 percent Ridgebury soil, and 15 percent other soils.

Typically, the Urban land consists of areas covered by buildings, streets, parking lots, and other structures that make it difficult to identify the soils. The natural soil layers have been altered or mixed with manufactured materials, such as bricks, broken concrete, or cinders.

The typical sequence, depth, and composition of the layers of the Ridgebury soil are as follows—

Surface layer:

0 to 8 inches, very dark grayish brown loam

Subsoil:

8 to 16 inches, brown gravelly fine sandy loam that has light brownish gray and dark yellowish brown mottles

16 to 26 inches, grayish brown gravelly fine sandy loam that has yellowish brown and light olive brown mottles

Substratum:

26 to 34 inches, light olive brown gravelly fine sandy loam that has grayish brown and olive yellow mottles

34 to 60 inches, olive brown gravelly loam that has brownish yellow mottles

Included in mapping are small areas of the poorly drained and very poorly drained Sun soils, areas of the moderately well drained Woodbridge soils, and bouldery areas. Sun soils are in depressions. Woodbridge soils are in the higher areas. Also included are areas of Udorthents adjacent to buildings and other structures. Included areas make up about 15 percent of the map unit and are generally 1 to 3 acres in size.

Properties of the Ridgebury soil—

Water table: Within a depth of 1.5 feet from November through May

Permeability: Moderate or moderately rapid (0.6-6.0 in/hr) in the surface layer and subsoil and slow or very slow (<0.02 in/hr) in the substratum

Available water capacity: Moderate

Reaction: Very strongly acid to slightly acid throughout the profile

Surface runoff: Medium or rapid

Erosion hazard: Severe during construction

Depth to bedrock: More than 60 inches

Most areas of this unit are used for residential or urban development. Trees or brushy plants are in many vacant areas between buildings. Some areas are used for gardens.

The main limitation on sites for dwellings with basements is the wetness. Installing drains around the footings and foundations can lower the water table. Diverting runoff away from the dwellings removes surface water.

The main limitations on sites for septic tank absorption fields are the seasonal wetness and the slow permeability in the dense substratum. Better suited sites should be selected, or an alternative system may be installed. Installing a drainage system around the absorption fields and constructing diversions to intercept water from the higher areas help to overcome the wetness. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed.

The main limitations on sites for local roads and streets are the wetness and a high potential for frost action. Building on raised fill material, installing a drainage system, and adding coarse grained subgrade or base material to the soil at frost depth help to overcome these limitations.

A capability subclass is not assigned.

UvB—Urban land-Riverhead complex, 2 to 8 percent slopes. This unit consists of areas of Urban land and the gently sloping, very deep, well drained Riverhead soil. It is in benchlike areas along streams and on broad plains. Individual areas are rectangular or irregularly shaped and range from 2 to 150 acres in size. They are about 50 percent Urban land, 25 percent Riverhead soil, and 25 percent other soils.

Typically, the Urban land consists of areas covered by buildings, streets, parking lots, and other structures that make it difficult to identify the soils. The natural soil layers have been altered or mixed with manufactured materials, such as bricks, broken concrete, or cinders.

The typical sequence, depth, and composition of the layers of the Riverhead soil are as follows—

Surface layer:
0 to 6 inches, dark brown loam

Subsurface layer:
6 to 14 inches, dark brown fine sandy loam

Subsoil:
14 to 25 inches, dark yellowish brown sandy loam
25 to 30 inches, yellowish brown loamy sand

Substratum:
30 to 60 inches, brown loamy sand

Included in mapping are small areas of Hinckley soils, small areas of Knickerbocker soils, areas of the moderately well drained and somewhat poorly drained Pompton soils, and areas of Charlton soils. Hinckley soils are very gravelly in the subsoil and substratum. Knickerbocker soils have a sandier subsoil than the Riverhead soil. Pompton soils are along drainageways and in slight depressions. Charlton soils are adjacent to the uplands. They formed in glacial till. Also included are areas of Udorthents adjacent to buildings and other structures; narrow areas of Fluvaquents and Udifluvents; and some areas, near fast-flowing streams, of soils that are similar to the Riverhead soil but are more gravelly throughout the subsoil and substratum. Included areas make up about 25 percent of the map unit and are as much as 2 acres in size.

Properties of the Riverhead soil—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderately rapid (2.0-6.0 in/hr) in the surface layer and subsoil and very rapid (>20 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: More than 60 inches

Most areas are used for community development. Areas between structures are wooded or are used for lawns and gardens.

No major limitations affect the use of the Riverhead soil as a site for dwellings with basements.

The main limitation on sites for septic tank absorption fields is a poor filtering capacity in the substratum. The poor filtering capacity may cause contamination of ground water by effluent. Better suited sites should be considered.

The main limitation on sites for local roads and streets is a moderate potential for frost action. Adding coarse grained base material to the soil during road construction can help to overcome this limitation.

A capability subclass is not assigned.

UvC—Urban land-Riverhead complex, 8 to 15 percent slopes. This unit consists of areas of Urban land and the strongly sloping, very deep, well drained Riverhead soil. It is along streams and hillsides. Individual areas are rectangular or irregularly shaped and range from 2 to 75 acres in size. They are about 50 percent Urban land, 25 percent Riverhead soil, and 25 percent other soils.

Typically, the Urban land consists of areas covered by buildings, streets, parking lots, and other structures that make it difficult to identify the soils. The natural soil layers have been altered or mixed with manufactured materials, such as bricks, broken concrete, or cinders.

The typical sequence, depth, and composition of the layers of the Riverhead soil are as follows—

Surface layer:
0 to 6 inches, dark brown loam

Subsurface layer:
6 to 14 inches, dark brown fine sandy loam

Subsoil:
14 to 25 inches, dark yellowish brown sandy loam
25 to 30 inches, yellowish brown loamy sand

Substratum:
30 to 60 inches, brown loamy sand

Included in mapping are small areas of Hinckley soils, small areas of Knickerbocker soils, the moderately well drained and somewhat poorly drained Pompton soils, and areas of Charlton soils. Hinckley soils are very gravelly in the subsoil and substratum. Knickerbocker soils have a sandier subsoil than the Riverhead soil. Pompton soils are along drainageways and in slight depressions. Charlton soils are adjacent to the uplands. They formed in glacial till. Also included are areas of Udorthents adjacent to buildings and other structures; narrow areas of Fluvaquents and Udifluvents; and some areas, near fast-flowing streams, of soils that are similar to the Riverhead soil but are more gravelly throughout the subsoil and substratum. Included areas make up about 25 percent of the map unit and are as much as 2 acres in size.

Properties of the Riverhead soil—

Water table: At a depth of more than 6 feet throughout the year
Permeability: Moderately rapid (2.0-6.0 in/hr) in the

surface layer and subsoil and very rapid (>20 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Surface runoff: Rapid
Erosion hazard: Severe during construction
Depth to bedrock: More than 60 inches

Most areas are used for community development. Areas between structures are wooded or are used for lawns and gardens.

The slope is the main limitation on sites for dwellings. Land shaping and designing the dwellings so that they conform to the natural slope of the land help to overcome this limitation.

The main limitation on sites for septic tank absorption fields is a poor filtering capacity in the substratum. The poor filtering capacity may cause contamination of ground water by effluent. Better suited sites should be considered.

The main limitations on sites for local roads and streets are a moderate potential for frost action and the slope. Adding coarse grained base material to the soil during road construction can reduce the effects of frost action. The roads can be designed so that they conform to the natural slope of the land.

A capability subclass is not assigned.

UwB—Urban land-Woodbridge complex, 2 to 8 percent slopes. This unit consists of areas of Urban land and the gently sloping, very deep, moderately well drained Woodbridge soil. It is on the lower parts of hillsides in the uplands. Individual areas are rectangular or elongated and generally range from 5 to 75 acres in size. They are about 50 percent Urban land, 25 percent Woodbridge soil, and 25 percent other soils.

Typically, the Urban land consists of areas covered by buildings, streets, parking lots, and other structures that make it difficult to identify the soils. The natural soil layers have been altered or mixed with manufactured materials, such as bricks, broken concrete, or cinders.

The typical sequence, depth, and composition of the layers of the Woodbridge soil are as follows—

Surface layer:
0 to 6 inches, dark brown loam

Subsurface layer:
6 to 12 inches, dark brown gravelly loam

Subsoil:
12 to 20 inches, yellowish brown gravelly loam
20 to 29 inches, dark yellowish brown and yellowish brown gravelly loam that has yellowish brown and light brownish gray mottles

Substratum:
29 to 45 inches, dark grayish brown gravelly fine sandy loam that has grayish brown and yellowish brown mottles
45 to 61 inches, olive brown and dark brown gravelly loam that has grayish brown mottles

Included in mapping are small areas of the poorly drained and very poorly drained Sun soils, areas of the well drained Paxton soils, the somewhat poorly drained and poorly drained Ridgebury soils, bouldery or very stony areas, and areas of soils that have a friable substratum. Sun soils are in depressions. Paxton soils are on ridges. Ridgebury soils are on the lower ridges and in slight depressions. Also included are areas of Udorthents adjacent to buildings and other structures. Included areas make up about 15 percent of the map unit and are generally 1 to 3 acres in size.

Properties of the Woodbridge soil—

Water table: 1.5 to 2.5 feet below the surface from November through May
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer and subsoil and slow or very slow (<0.02 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Severe during construction
Depth to bedrock: More than 60 inches

Most areas are used for urban development. Areas between structures are wooded, are covered by brushy plants, or are used for lawns and gardens.

The main limitation on sites for dwellings with basements is wetness. Installing drains around the footings and foundations can lower the water table. Diverting runoff away from the dwellings can remove surface water.

The main limitations on sites for septic tank absorption fields are the seasonal wetness and the slow permeability in the dense substratum. Installing a drainage system around the absorption fields and constructing diversions to intercept runoff from the higher areas help to overcome the wetness. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed.

The main limitation on sites for local roads and streets is a high potential for frost action. Installing a drainage system and adding coarse grained subgrade

or base material to the soil at frost depth can reduce the effects of frost action.

A capability subclass is not assigned.

WdA—Woodbridge loam, 0 to 3 percent slopes. This soil is nearly level, very deep, and moderately well drained. It is on the lower parts of hillsides in the uplands. Individual areas are irregularly shaped or elongated and generally range from 2 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark brown loam

Subsurface layer:
6 to 12 inches, dark brown gravelly loam

Subsoil:
12 to 20 inches, yellowish brown gravelly loam
20 to 29 inches, dark yellowish brown and yellowish brown gravelly loam that has yellowish brown and light brownish gray mottles

Substratum:
29 to 45 inches, dark grayish brown gravelly fine sandy loam that has grayish brown and yellowish brown mottles
45 to 61 inches, olive brown and dark brown gravelly loam that has grayish brown mottles

Included with this soil in mapping are small areas of the poorly drained and very poorly drained Sun soils, areas of the well drained Paxton soils, the somewhat poorly drained and poorly drained Ridgebury soils, bouldery or very stony areas, and areas of soils that have a friable substratum. Sun soils are in depressions. Paxton soils are on ridges. Ridgebury soils are on the lower ridges and in slight depressions. Included areas make up about 15 percent of the map unit and are generally 1 to 3 acres in size.

Soil properties—

Water table: 1.5 to 2.5 feet below the surface from November through May
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer and subsoil and slow or very slow (<0.02 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Slight
Depth to bedrock: More than 60 inches

Most areas are wooded or are covered by brushy plants. A few areas are used for community development or pasture.

The main limitation on sites for dwellings with basements is wetness. Installing drains around the footings and foundations can lower the water table. Diverting runoff away from the dwellings can remove surface water.

The main limitations on sites for septic tank absorption fields are the seasonal wetness and the slow permeability in the dense substratum. Installing a drainage system around the absorption fields and constructing diversions to intercept runoff from the higher areas help to overcome the wetness. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed.

The main limitation on sites for local roads and streets is a high potential for frost action. Installing a drainage system and adding coarse grained subgrade or base material to the soil at frost depth can reduce the effects of frost action.

This soil is suited to cultivated crops, hay, and pasture. The wetness may interfere with farming in some years. Proper stocking rates and restricted grazing during wet periods can help to maintain the quality of the pasture.

The potential productivity of this soil for northern red oak is moderately high. The windthrow hazard is moderate because of the wetness.

The capability subclass is IIw.

WdB—Woodbridge loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and moderately well drained. It is on the lower parts of hillsides in the uplands. Individual areas are irregularly shaped or elongated and generally range from 2 to 35 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark brown loam

Subsurface layer:
6 to 12 inches, dark brown gravelly loam

Subsoil:
12 to 20 inches, yellowish brown gravelly loam
20 to 29 inches, dark yellowish brown and yellowish brown gravelly loam that has yellowish brown and light brownish gray mottles

Substratum:
29 to 45 inches, dark grayish brown gravelly fine sandy loam that has grayish brown and yellowish brown mottles

45 to 61 inches, olive brown and dark brown gravelly loam that has grayish brown mottles

Included with this soil in mapping are small areas of the poorly drained and very poorly drained Sun soils, areas of the well drained Paxton soils, the somewhat poorly drained and poorly drained Ridgebury soils, bouldery or very stony areas, and areas of soils that have a friable substratum. Sun soils are in depressions. Paxton soils are on ridges. Ridgebury soils are on the lower ridges and in slight depressions. Included areas make up about 15 percent of the map unit and are generally 1 to 3 acres in size.

Soil properties—

Water table: 1.5 to 2.5 feet below the surface from November through May
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer and subsoil and slow or very slow (<0.02 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Erosion hazard: Moderate
Depth to bedrock: More than 60 inches

Most areas of this soil are wooded or are covered by brushy plants. A few areas are used for community development or pasture.

The main limitation on sites for dwellings with basements is wetness. Installing drains around the footings and foundations can lower the water table. Diverting runoff away from the dwellings can remove surface water.

The main limitations on sites for septic tank absorption fields are the seasonal wetness and the slow permeability in the dense substratum. Installing a drainage system around the absorption fields and constructing diversions to intercept runoff from the higher areas help to overcome the wetness. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed.

The main limitation on sites for local roads and streets is a high potential for frost action. Installing a drainage system and adding coarse grained subgrade or base material to the soil at frost depth reduce the effects of frost action.

This soil is suited to cultivated crops, hay, and pasture. The wetness may interfere with farming in some years. Erosion is a moderate hazard. A system of conservation tillage that leaves crop residue on the surface and contour farming or stripcropping help to control erosion. Proper stocking rates, rotation grazing, applications of fertilizer, and restricted grazing during wet periods help to maintain the quality of the pasture.

The potential productivity of this soil for northern red oak is moderately high. The windthrow hazard is moderate because of the wetness.

The capability subclass is IIe.

WdC—Woodbridge loam, 8 to 15 percent slopes. This soil is strongly sloping, very deep, and moderately well drained. It is on the lower parts of hillsides in the uplands. Individual areas are irregularly shaped or elongated and generally range from 2 to 35 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches, dark brown loam

Subsurface layer:
6 to 12 inches, dark brown gravelly loam

Subsoil:
12 to 20 inches, yellowish brown gravelly loam
20 to 29 inches, dark yellowish brown and yellowish brown gravelly loam that has yellowish brown and light brownish gray mottles

Substratum:
29 to 45 inches, dark grayish brown gravelly fine sandy loam that has grayish brown and yellowish brown mottles
45 to 60 inches, olive brown and dark brown gravelly loam that has grayish brown mottles

Included with this soil in mapping are small areas of the poorly drained and very poorly drained Sun soils, areas of the well drained Paxton soils, the somewhat poorly drained and poorly drained Ridgebury soils, bouldery or very stony areas, and areas of soils that have a friable substratum. Sun soils are in depressions. Paxton soils are on ridges. Ridgebury soils are on the lower ridges and in slight depressions. Also included are areas of urban land. Included areas make up about 20 percent of the map unit and are generally 1 to 3 acres in size.

Soil properties—

Water table: 1.5 to 2.5 feet below the surface from November through May
Permeability: Moderate (0.6-2.0 in/hr) in the surface layer and subsoil and slow or very slow (<0.02 in/hr) in the substratum
Available water capacity: Moderate
Reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid

Erosion hazard: Moderate
Depth to bedrock: More than 60 inches

Most areas of this soil are wooded or are covered by brushy plants. A few areas are used for community development or pasture.

The main limitations on sites for dwellings with basements are wetness and the slope. Installing drains around the footings and foundations can lower the water table. Diverting runoff away from the dwellings can remove surface water. Land shaping and grading and designing the dwellings so that they conform to the natural slope of the land help to overcome the slope.

The main limitations on sites for septic tank absorption fields are the seasonal wetness and the slow permeability in the dense substratum. Installing a drainage system around the absorption fields and constructing diversions to intercept runoff from the higher areas help to overcome the wetness. Enlarging the absorption fields or the trenches below the distribution lines increases the rate at which the effluent is absorbed.

The main limitation on sites for local roads and streets is a high potential for frost action. Installing a drainage system and adding coarse grained subgrade or base material to the soil at frost depth can reduce the effects of frost action.

This soil is suited to cultivated crops, hay, and pasture. The wetness may interfere with farming in some years. Erosion is a moderate hazard. A system of conservation tillage that leaves crop residue on the surface, contour farming, stripcropping, and terraces help to control erosion. Proper stocking rates, rotation grazing, applications of fertilizer, and restricted grazing during wet periods help to maintain the quality of the pasture.

The potential productivity of this soil for northern red oak is moderately high. The windthrow hazard is moderate because of the wetness.

The capability subclass is IIIe.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban or built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Soil Conservation Service.

The survey area has about 66,875 acres of prime farmland. This acreage makes up about 16 percent of the total acreage.

The map units in the survey area that are considered prime farmland are listed in table 4. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 3. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Soils that have a seasonal high water table qualify as prime farmland only in areas where this limitation has been overcome by drainage measures. The need for these measures is indicated after the map unit name in table 4. Onsite evaluation is needed to determine whether or not these limitations have been overcome by corrective measures.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Erosion is a potential hazard on much of the land in the survey area. It is a principal source of sedimentation, which is a major cause of water pollution. All soils are subject to erosion. Exposing the soil surface by cultivating or by removing the vegetative cover, especially on sloping soils, greatly increases the potential for accelerated erosion. On soils susceptible to accelerated erosion, such as Charlton loam, 8 to 15 percent slopes, a cropping system that includes cover crops and green manure crops is needed in combination with such measures as minimum tillage or no-till, mulch planting, crop residue management, and applications of lime and fertilizer. Contour farming, terraces, and contour stripcropping also help to control erosion. Diversions and grassed waterways convey runoff from one area to another at a nonerosive velocity. Establishing windbreaks can reduce the hazard of wind erosion.

The effectiveness of a particular combination of measures differs from one soil to another, but different combinations can be equally effective on the same soil. Additional information and assistance in planning an effective combination of erosion-control practices are available at the local office of the Soil Conservation Service.

Pasture grasses or a grass sod is effective in controlling erosion on all but a few of the soils in the survey area. A high level of pasture management is needed on some soils to maintain sufficient ground cover to control erosion. Pasture management practices include proper stocking rates, applications of fertilizer, rotation grazing, weed and brush control, and careful

selection of seeding mixtures. Deferring grazing allows for regrowth of the pasture plants. On some soils, it is important to establish pasture plants that require the least amount of renovation to maintain a good vegetative cover and provide adequate forage.

Soil fertility is a management concern in the survey area. Most of the soils require applications of lime or fertilizer or both. The amounts needed depend on the natural content of lime and plant nutrients (which should be determined by laboratory analyses of soil samples), on the needs of the crop, and on the level of yields desired. The Cooperative Extension Service can assist in testing and in interpreting the data.

The average content of organic matter in the surface layer of the mineral soils in the survey area is about 4 percent. Nitrogen is released from organic matter, but most of it is in complex organic forms that are not usable by plants. Timely applications of nitrogen fertilizer are necessary to supplement the nitrogen available in the soil. The soils in the survey area are naturally low in available phosphorus. Timely additions of appropriate amounts of phosphate in the form of fertilizers are essential for good crop yields. Most of the soils also have low levels of potassium.

Nitrogen may be lost either through leaching in rapidly permeable soils, such as Riverhead soils, or by denitrification in the less permeable soils, such as Ridgebury soils. Small amounts of nitrogen applied at frequent or timely intervals provide the best results. References containing new research findings on fertilization are available upon request from the staff of the New York College of Agriculture at Cornell University. In the absence of soil tests, these references can be used as a guide in determining lime and fertilizer needs.

Most of the soils in the survey area are fairly high in content of organic matter. This high level can be maintained by regularly adding organic material from animal manure, returning crop residue to the soil, and growing sod crops, cover crops, and green manure crops. Tillage tends to reduce organic matter content and break down soil structure, especially when the soils are saturated or are too dry.

Drainage is important on much of the existing or potential farmland in the survey area. On wet soils, such as Fredon silt loam, yields of cultivated crops can be increased by artificial drainage. Open ditches or tile drains are used to improve drainage. Drainage on sloping soils is more effective if the ditches or tile lines intercept the water as it moves downslope. If tile drains or open ditches are used, suitable outlets are needed.

Droughtiness or a low available water capacity commonly limits plant growth on about 7,000 acres of potential or existing farmland in the survey area. In years with less than normal rainfall, an additional 24,000 acres would likely be affected. Sandy or gravelly soils, such as Hinckley and Knickerbocker soils, and soils that are moderately deep over bedrock, such as Chatfield soils, are droughty.

Increasing the content of organic matter increases the available water capacity of droughty soils. Using green manure crops, incorporating crop residue into the soil, and adding animal manure to the soil help to maintain the content of organic matter.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for

field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The acreage of soils in each capability class and subclass is shown in table 6. The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Landscape Plantings

Laura A. Zaimes, soil conservationist, Soil Conservation Service, and Richard Weir III, horticultural specialist, Cooperative Extension Service, helped prepare this section.

Table 7 provides examples of deciduous and evergreen trees, shrubs, and ground cover that are suitable for planting on the soils indicated. Local nurseries, horticulturists, landscape architects, or extension agents can provide information on many additional species that can be planted on different kinds of soil. Library references also provide information on many aspects of landscaping in urban areas *(9)*. Such references describe the effects of heat from pavement and the salts, shade, and microclimates influencing individual areas.

Many of the soils in the survey area, especially those mapped in complexes with urban land, have been disturbed to some degree during excavation for utilities and foundations for buildings and during construction of roadways and sidewalks.

The species in table 7 ordinarily grow well on the specified soils unless the soils have been severely altered, either physically or chemically. The closer a soil is to a structure or a construction site, the more likely it is to have been disturbed. For instance, wood, brick, gypsum board, metal stripping, mortar, and other building materials are commonly discarded around the foundation of a building under construction. These materials often get mixed into the backfill around the foundation. Also, fill material brought to a construction site may be quite different from the original soil on the site.

Practically all of the soils in undisturbed or only slightly disturbed areas in Putnam and Westchester Counties are strongly acid to moderately acid and are generally suitable for plants that grow well in an acidic environment, such as azaleas and other rhododendrons. These species are commonly planted very close to foundations, however, where the natural pH may have shifted to a more basic condition because of construction activities. Soil reaction should be determined before plants are established around foundations or in other severely disturbed areas.

The following factors are important when plants are selected for landscaping purposes.

Shade.—Any map unit that is dominated by urban land has a high density of buildings. As a result, the soil

between or around the buildings may be shaded much or part of the day. The selection of plants should be based on shade tolerance, growth potential, and disease resistance. Although azaleas generally grow well in shaded areas, many of the common flowers and ground cover do not. Other shade-tolerant plants are rhododendrons, holly, grape, laurel, leucothoe, andromeda, and dogwood. Lime is generally not needed in shaded areas because most plants that thrive in a shaded environment also grow well in an acid soil. On any soil, additions of peat moss, humus, or compost thoroughly incorporated into the soil material can be beneficial. In areas where lime is needed, agricultural or dolomitic limestone should be used instead of hydrated lime.

Wetness.—Except for ferns and mosses, few plants thrive in wet soils, such as Sun and Raynham soils. A subsurface drainage system can be installed if the soil is permeable enough for excess water to move through the soil to the drainage tile. Adding loamy fill material and using raised beds help to provide a satisfactory root zone. In some areas the wetness may be caused by runoff from adjacent slopes. Drains or ditches may be needed to intercept and divert the runoff. In urban areas, reducing the effects of soil wetness is sometimes difficult because of property line restrictions that limit the placement of ditches or of outlets for subsurface drains. Additional information on drainage is available at the local office of the Soil Conservation Service.

Restricted root zone.—Generally, soils that have a restricted root zone do not hold enough moisture for plants throughout the growing season. In urban areas the root zone can be restricted for a variety of reasons. Chunks of asphalt or concrete may have been covered by grading and filling on construction sites. In areas where Paxton, Woodbridge, and Ridgebury soils have been severely graded during construction, the dense, compact layers in the substratum may be exposed or may be within a few inches of the surface. Shrubs, lawns, trees, and gardens planted in these areas are not likely to grow well because the roots cannot penetrate the dense layers. The plants have a very limited amount of available moisture during dry periods and are susceptible to frost heave during periods of alternating freezing and thawing. Also, the exposed substratum is very difficult to till because it has poor structure and is very compact. Bedrock is at a depth of 20 to 40 inches in Chatfield soils and at a depth of 10 to 20 inches in Hollis soils. Soils in areas adjacent to exposed bedrock are even more shallow. Where a root-restricting layer or bedrock is near the surface, the root zone can be increased by adding topsoil and by mixing as much organic matter as possible into the original soil. These measures increase the moisture-holding capacity and improve soil tilth, thus providing a better medium for root development.

Compaction.—A noncompacted soil that has good structure and tilth is about 50 percent mineral soil particles and 50 percent pore space. When the soil is at the proper moisture content for tilling or spading, about half of the pore space is filled with water and the rest is filled with air. In a highly compacted soil, the pore space has been greatly reduced by the weight of machinery or foot traffic as mineral soil solids are forced into the pore space. As a result, the soil holds less air and water and is less permeable. Any soil that is either naturally compact or has been mechanically compacted provides a very poor environment for roots, which is reflected in the poor quality of the plant above the ground. Compaction is commonly a problem in areas of loamy soils that are mapped in complexes with urban land. Incorporating organic matter in at least the upper 12 inches of the soil and in the planting hole improves tilth and provides a better environment for root development. Organic matter can be incorporated by adding peat moss, decayed leaves, compost, and green manure plants, such as rye or buckwheat. Areas that are subject to activities that cause further compaction, such as foot traffic, can be protected by covering the surface with a mulch of pine bark, wood chips, or other material.

Droughtiness.—Droughtiness is a limitation in areas of several of the soils in the survey area. The gravelly Hinckley soils, the sandy Knickerbocker soils, the moderately deep Chatfield soils, and the shallow Hollis soils are droughty. Droughtiness may also occur in Riverhead and Charlton soils during dry periods in summer. Droughty soils have a low capacity for storing moisture for plant growth. If supplemental or irrigation water is not available, plants become stressed and are more susceptible to disease and winter injury. Lawn grasses that have very shallow root systems are particularly susceptible to droughty soil conditions. Browning of lawns in midsummer is common, unless rainfall is frequent or supplemental water is applied.

In order to ensure successful landscape plantings and reduce the amount of supplemental water needed, it is important to increase the available water capacity of droughty soils. Increasing the content of organic matter by adding peat moss or compost in the planting hole and tilling green manure plants into the surface layer are suitable management measures. Also, loamy or silty fill material, which has a naturally high available water capacity, can be spread over the soil or mixed into the sandy surface layer. When new plantings are established, covering the area with a temporary mulch, such as straw or wood chips, may be necessary to

reduce evaporation. Selecting adapted landscape plantings is very important in areas of the drier, sandy soils. Species that have a deep rooting system or are tolerant of droughty soil conditions are generally the best choices. Trees that have a shallow, spreading root system, such as Norway maple, reduce the amount of water available to nearby plants.

Supplemental watering.—The ability of the soil to store moisture, the rooting characteristics of the plants, the amount of rainfall, and the evapotranspiration rate affect the relationship between soils and plants. For lawns and most vegetable crops, the upper 12 to 18 inches of soil contains the major portion of the root system and is the reservoir that provides most of the water used by the plant. Coarse textured soils, such as Hinckley soils, have about 1 inch of water available in the upper 12 inches. Medium textured soils, such as Woodbridge soils, have about 1.8 inches of water available in the upper 12 inches. General guidelines can be used to determine the amount of water needed by plants. For example, in areas where vegetation covers the ground completely and where an abundant water supply is available, water use during a day with 12 hours of sunshine and a mean temperature of 85 degrees will be about 0.2 inch; at a temperature of about 65 degrees, the rate of water use will be about 0.10 inch. By taking into account the amount of rainfall received and the water-holding capacity of the soil, the amount of supplemental water needed can be estimated. In areas of coarse textured and moderately coarse textured soils, such as Hinckley and Riverhead soils, the maximum rate at which irrigation water should be applied on sod is about 1.0 inch per hour. In areas of medium textured soils that have a compact substratum, the maximum application rate on sod is 0.5 inch per hour.

Garden Crops, Fruits, and Flowers

Laura A. Zaimes, soil conservationist, Soil Conservation Service, and William J. Sanok, vegetable crop specialist, Cooperative Extension Service, helped prepare this section.

Most garden and fruit crops and flowers grow well in silty or loamy, permeable, well drained soils that have a medium or high available water capacity, have good tilth, and warm up early in the spring. Most of the soils in Putnam and Westchester Counties are naturally very strongly acid to moderately acid. Except for a few crops, such as potatoes and tomatoes, garden crops grow better in soils that are moderately acid to neutral. If lime is added, the amount to be applied should be determined by soil tests.

Table 8 rates the soils in the survey area for their suitability for perennial vegetables, annual flowers and vegetables, and tree fruit and small fruit. The ratings are based on the experience of agronomists, extension agents, and soil conservationists. They relate to the relative productivity of the soils in their natural state.

The soils are rated as very good, good, fair, poor, or very poor. Soils rated *very good* have few or no limitations and are capable of sustaining high yields of the crops listed. They have the properties that are most desirable for the production of fruits, vegetables, and flowers. Soils rated *good* have some properties or limitations that result in slightly lower crop production than soils that have a rating of very good. They may have a slightly lower available water capacity, a slightly shallower rooting depth, or a somewhat shorter growing season than the soils rated very good. A rating of *fair* indicates that the soil has limitations that require special management, such as irrigation or drainage, to achieve a high level of production. A rating of *poor* indicates that the soil has poor drainage, a low available water capacity, moderately steep slopes, or other serious limitations that are somewhat difficult to overcome. Soils rated *very poor* have very serious limitations, such as very poor drainage, steep slopes, or a very low available water capacity. These limitations are difficult to overcome. Soils rated poor or very poor can be as productive as those rated very good if proper management practices are applied. These practices can include artificial drainage and application of irrigation water.

In table 8, the ratings given are for the dominant response of the specific group of crops to the particular soil conditions. Within the groups of crops, however, specific crops may grow well under a wide range of soil conditions. External factors that have a strong influence on crop growth, such as air drainage, presence of frost pockets, and amount of sunlight, are not considered in the ratings.

On all soils, management should include proper planting and seeding rates; erosion-control measures where needed; selection of high-yielding plant varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; and irrigation during dry periods. Other management practices include maintaining optimum levels of nitrogen, phosphorus, potassium, and trace elements; effective use of crop residue, manure, and green manure crops; and harvesting methods that ensure the smallest possible loss.

The information given in table 8 is supplemented by the description of each soil under the heading "Detailed Soil Map Units." Additional information can be obtained from the local office of the Cooperative Extension Service or the Soil Conservation Service.

Woodland Management and Productivity

Approximately 70,000 acres, or about 25 percent of Westchester County, is classified as commercial forest land. Approximately 90,000 acres, or about 60 percent of Putnam County, is classified as commercial forest land *(11)*. The dominant forest types in the commercial forest land in the survey area are oak and northern hardwood.

Table 9 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce. The number 1 indicates low potential productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X*, stoniness or rockiness; *W*, excess water in or on the soil; *T*, toxic substances in the soil; *D*, restricted rooting depth; *C*, clay in the upper part of the soil; *S*, sandy texture; *F*, a high content of rock fragments in the soil; and *N*, snowpack. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, F, and N.

In table 9, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment and season of use are not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *productivity class*. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of

growth rate, quality, value, and marketability.

The *productivity class*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic meters per hectare per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It generally is the most common species on the soil and is the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Recreation

The soils of the survey area are rated in table 10 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 10, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 10 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 13 and interpretations for dwellings without basements and for local roads and streets in table 12.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Robert E. Myers, wildlife biologist, Soil Conservation Service, helped prepare this section.

Parts of Putnam and Westchester Counties are extremely urban in nature, but some areas, especially in Putnam County, are undeveloped. Wildlife is an important resource in both the urbanized and nonurbanized areas. Many species of wildlife make their homes in idle fields, shrubby lots, forest land, and backyards and along right-of-ways. Small or medium-sized nature preserves or wildlife sanctuaries are scattered throughout both counties. A few large wildlife areas are also in the survey area. These include the Blue Mountain and Ward Poundridge Reservations in Westchester County and the Hudson Highlands and Fahnestock State Parks in Putnam County. In addition to many species of songbirds, the survey area has populations of deer, ruffed grouse, pheasants,

woodchucks, bobwhite quail, gray squirrels, woodcock, fox, ducks, geese, and marsh birds.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 11, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are gray dogwood, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, yew, cedar, and hemlock.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, arrowhead, burreed, pickerelweed, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, meadow vole, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous

plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the "Glossary."

Building Site Development

Table 12 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are

structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 13 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 13 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 13 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability

in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 13 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 14 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications

for each use vary widely. In table 14, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 15 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a

permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind erosion or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 16 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the "Glossary."

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 17 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil

to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 17, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 18 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Some soils may be assigned to two hydrologic groups in table 18. For soils that have a seasonal high water table but can be drained, the first letter is for drained areas and the second is for undrained areas. For soils that are less than 20 inches deep over bedrock, the first letter is for areas where the bedrock is cracked and pervious and the second is for areas where the bedrock is impervious or where exposed bedrock makes up more than 25 percent of the surface.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 18 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in

table 18 are the depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 18.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate,* or *high.* It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Relationship Between Parent Material, Landscape Position, and Drainage Class of the Soils

Table 19 shows the relationship between some of the factors that have influenced the development and morphology of the soils in Putnam and Westchester Counties. The soils are grouped according to the type of landscape positions on which they occur. The soils that are on similar landscapes are grouped according to their depth over bedrock. The soils are also grouped by texture and by morphology of the parent material in which they formed. Finally, the soils are grouped by drainage class.

Soils that have the same parent material, soil depth, and landscape position but are in different drainage classes form a soil catena. Riverhead, Pompton, and Fredon soils are examples of soils that form a catena in this survey area. Some soils, such as Hollis soils, have drainage features that place them in more than one drainage class. These soils are listed more than once in the table.

The information in table 19 establishes general relationships among the soils in the survey area. It supplements the information provided in the section "Formation of the Soils." Detailed information on the morphology and characteristics of each soil is provided in the section "Soil Series and their Morphology."

Engineering Properties of Geologic Deposits

The geologic deposits that occur in Putnam and Westchester Counties include glacial till, outwash, lacustrine deposits, alluvium, and organic deposits. The significance of each kind of deposit for engineering is influenced to a great extent by its mode of deposition. This, in turn, determines the texture of the material and the internal structure of the landform. Among the influences are position on the landscape and depth to the water table.

In Putnam and Westchester Counties, the geologic deposits are divided into the following categories: deep till deposits; shallow-to-rock deposits; stratified, coarse

textured deposits; stratified, fine textured deposits; and organic deposits. These deposits are described in the following paragraphs.

Deep till deposits.—Deep till deposits are unstratified, highly variable mixtures of all particle sizes ranging from rock fragments to clay. This material was scoured and transported from nearby sources by glacial ice and was deposited as ground moraines or end moraines. Bedrock is generally at a depth of more than 5 feet, but in some small areas it may be closer to the surface or may occur as rock outcrops. The individual rock and mineral fragments in the soil generally reflect the types of bedrock in the immediate area.

Soils that formed in mixed, deep till deposits include Charlton, Leicester, Paxton, Ridgebury, Stockbridge, Sun, Sutton, and Woodbridge soils. These soils are the most dense and compact of the unconsolidated deposits in the survey area. Most of the till deposits have been subjected to the compactive weight of overriding ice. Most of the deep till soils are nearly level or gently sloping, but some range from nearly level to very steep. The characteristics of many landscapes are such that cut and fill earthwork is needed in most construction. The soils commonly provide stable, relatively incompressible foundations for engineering works. Fill material from these deposits, when properly compacted, generally provides stable embankments. Steep cut slopes commonly are subject to surface sloughing and erosion. Sun soils are subject to ponding.

Shallow-to-rock deposits.—Shallow-to-rock deposits consist of a veneer of unconsolidated sediments that are underlain by bedrock. The soil material commonly is 0.5 foot to 4.0 feet thick, and rock outcrop is common in some areas. The landforms and topography generally are controlled by the bedrock. Soils that formed in glacial till over metamorphic rock include Chatfield and Hollis soils.

The main engineering concerns are those that relate to the underlying bedrock and ground water. Other engineering considerations are similar to those described for the overlying material. Fill material is limited in quantity because of the restricted depth to bedrock.

Stratified, coarse textured deposits.—Materials dominated by gravel and sand sorted by glacial meltwater into layered or stratified deposits are included in this category, as well as coarser textured material deposited by fluvial action. They occupy such geologic landforms as outwash plains and terraces, the coarser portions of deltas, and ice-contact deposits. The strata within these deposits may be well sorted or poorly sorted and range in particle size from cobbles to silt. The deposits commonly are loose and porous and have moderately rapid or rapid permeability.

Fredon, Hinckley, Knickerbocker, Pompton, and Riverhead soils formed on gravelly outwash plains and terraces or ice-contact deposits. Unadilla soils formed in stratified, fine textured material underlain by coarse textured material.

Coarse textured deposits generally have relatively high strength and low compressibility. Because they are loose and porous, most of these deposits are not highly erodible but are subject to settlement when vibrated.

These deposits of gravel and sand have many uses as construction material. Their uses depend on gradation, soundness, and plasticity. They are sources of sand and gravel for general use, and they may be used as fill material for highway embankments, in parking areas and other developments, and on construction sites where this material is needed to reduce stress on the underlying soils. They may also be used as subbase for pavements; wearing surfaces for driveways, parking lots, and some roads; material for highway shoulders; and free draining backfill for structures and pipes. In addition, they may be used outside shells of dams for impounding water and as slope protection blankets to drain and help stabilize wet, cut slopes.

Stratified, fine textured deposits.—Deposits in this category consist of lacustrine, fine textured sediment transported by glacial meltwater and deposited in quiet proglacial lakes and ponds. Raynham soils formed in lake-laid deposits of silt.

Because of their fine texture and high moisture content, these deposits have relatively low strength. The soils that have a high content of fine sand and silt have low compressibility but are highly erodible and are susceptible to frost action.

The fine textured deposits are difficult to use for engineering works, especially in areas that are flat, wet, and subject to ponding. Sites to be used for embankments and heavy structures or buildings on all of the soils that formed in these finer textured sediments must be investigated to determine strength and settlement characteristics and the effects of ground water.

Organic deposits.—Organic deposits consist mainly of accumulations of plant remains. In some places they include a minimal amount of mineral soil material. These deposits occur in very poorly drained depressional areas, in bogs that are covered with water during most of the year, or in tidal marsh areas.

Carlisle soils formed in deep organic material. Palms soils are shallow over fine textured material. Ipswich soils formed in tidal marsh areas that are subject to periodic inundation. The soils that formed in organic deposits are entirely unsuitable for foundations for

engineering works because they are wet, weak, and highly compressible. Generally, the organic material should be removed to a depth where there is suitable underlying material and should be replaced with suitable backfill. Placing fill material over organic deposits results in long-term settlement.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(10)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 20 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Inceptisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquept (*Aqu*, meaning water, plus *ept*, from Inceptisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquepts (*Hapl*, meaning minimal horizonation, plus *aquept*, the suborder of the Inceptisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Aeric* identifies the subgroup that has drainage properties that are slightly better than is typical of the great group. An example is Aeric Haplaquepts.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-silty, mixed, nonacid, mesic Aeric Haplaquepts.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series or higher taxonomic group recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each soil series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(12)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(10)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Carlisle Series

The Carlisle series consists of very deep, very poorly drained soils in broad depressional or basinlike swamps

and bogs. These soils formed in deposits of highly decomposed organic material. Slopes are less than 2 percent.

Carlisle soils formed in material similar to that in which Palms and Ipswich soils formed. Carlisle soils are not subject to daily tidal flooding. They have more than 51 inches of organic material. Palms soils have less than 51 inches of organic material.

Typical pedon of Carlisle muck, in the town of Lewisboro, in Westchester County, 0.75 mile east of State Route 124, about 1.0 mile south of State Route 35:

Oa1—0 to 4 inches; muck, dark reddish brown (5YR 2/2) broken face, black (5YR 2/1) rubbed and pressed; about 5 percent fibers, a trace rubbed; weak medium granular structure; nonsticky; many fine roots; primarily herbaceous fibers; slightly acid; abrupt smooth boundary.

Oa2—4 to 17 inches; muck, black (5YR 2/1) broken face, rubbed, and pressed; about 40 percent fibers, less than 5 percent rubbed; weak coarse subangular blocky structure; nonsticky; common fine roots in the upper 2 inches; primarily herbaceous fibers; neutral; clear smooth boundary.

Oa3—17 to 52 inches; muck, black (5YR 2/1) broken face, rubbed, and pressed; about 75 percent fibers, less than 5 percent rubbed; massive; nonsticky; primarily herbaceous fibers; common reddish brown (5YR 4/3), partially decomposed woody fragments 0.5 inch to 6.0 inches in length; neutral; abrupt smooth boundary.

Oa4—52 to 60 inches; muck, dark reddish brown (5YR 3/3) broken face, dark reddish brown (5YR 3/2) rubbed and pressed; about 65 percent fibers, less than 5 percent rubbed; massive; nonsticky; primarily herbaceous fibers; neutral.

The depth to bedrock is more than 60 inches. The organic material is more than 51 inches thick, and in most areas it is at least 10 to 15 feet thick over a contrasting mineral layer. Varying amounts of undecomposed plant remains are in the profile, some of which are woody. The combined thickness of hemic layers throughout the profile is less than 10 inches.

The surface tier has hue of 5YR, value of 2, and chroma of 1 or 2. It is dominantly sapric material, but in some pedons it has varying proportions of both sapric and hemic material. Reaction ranges from moderately acid to neutral.

The subsurface tier has hue of 5YR to 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 3. It is dominantly sapric material. The content of rubbed fiber is less than 16 percent, by volume. Reaction ranges from moderately acid to neutral.

The bottom tier has hue of 5YR to 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 3. It is dominantly sapric material but has thin layers of hemic material. Reaction ranges from moderately acid to neutral.

Charlton Series

The Charlton series consists of very deep, well drained soils on the sides and tops of glaciated hills. These soils formed in glacial till derived from granite, schist, and gneiss. Slopes range from 2 to 45 percent.

Charlton soils are near Chatfield, Hollis, Sutton, and Paxton soils and are in similar landscape positions. They also are near Hinckley and Riverhead soils, which are on adjacent terraces. Charlton soils are deeper over bedrock than the Chatfield and Hollis soils, are not so wet as the moderately well drained Sutton soils, and do not have the firm, dense substratum that is typical in the Paxton soils. Charlton soils have a moderately coarse textured substratum of nonstratified glacial till, and Hinckley and Riverhead soils are underlain by stratified sand and gravel.

Typical pedon of Charlton loam, 8 to 15 percent slopes, in the town of North Castle, in Westchester County, 87 feet south and 230 feet east of the intersection of Mead Road and Round Hill Road:

Oe—1 inch to 0; partially decomposed leaf and twig litter.

Ap1—0 to 2 inches; very dark grayish brown (10YR 3/2) loam; moderate medium granular structure; friable; many very fine and common fine roots; about 5 percent rock fragments; strongly acid; clear wavy boundary.

Ap2—2 to 8 inches; dark brown (10YR 3/3) loam; moderate medium granular structure; friable; common very fine and fine roots; about 5 percent rock fragments; strongly acid; abrupt smooth boundary.

Bw1—8 to 15 inches; dark yellowish brown (10YR 4/4) sandy loam; weak medium subangular blocky structure; friable; common very fine and fine and few medium roots; about 5 percent rock fragments; strongly acid; clear wavy boundary.

Bw2—15 to 24 inches; dark yellowish brown (10YR 4/6) sandy loam; weak coarse subangular blocky structure; friable; common fine and few medium roots; about 10 percent rock fragments; strongly acid; abrupt smooth boundary.

C—24 to 60 inches; dark grayish brown (2.5Y 4/2) sandy loam; thin lenses of loamy sand; massive; friable; few fine roots in the upper part; about 10 percent rock fragments; strongly acid.

Thickness of the solum ranges from 20 to 38 inches. The depth to bedrock is commonly more than 60 inches, but in some pedons bedrock is at a depth of 40 to 60 inches. The content of rock fragments ranges from 5 to 35 percent to a depth of 40 inches and from 5 to 50 percent, by volume, below this depth.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4. It is dominantly loam, but the range includes fine sandy loam or loam in the fine-earth fraction. Reaction ranges from very strongly acid to moderately acid in areas that have not been limed. Some pedons have an A horizon, which has slightly lower value and chroma than the Ap horizon.

The upper part of the B horizon has hue of 7.5YR or 10YR and value and chroma of 4 to 6. The lower part has hue of 10YR or 2.5Y and value and chroma of 4 to 6. The texture of the B horizon is sandy loam, fine sandy loam, or loam in the fine-earth fraction. Reaction ranges from very strongly acid to moderately acid.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. It is sandy loam, fine sandy loam, or loam that has thin lenses or pockets of loamy sand in the fine-earth fraction. Reaction ranges from very strongly acid to moderately acid.

Chatfield Series

The Chatfield series consists of moderately deep, well drained and somewhat excessively drained soils on the sides and tops of glaciated hills. These soils formed in glacial till deposits over highly fractured, folded, and tilted granite, schist, and gneiss. Slopes range from 3 to 35 percent.

Chatfield soils are in a complex pattern with areas of rock outcrop and Charlton and Hollis soils. They are deeper over bedrock than the Hollis soils and are shallower over bedrock than the Charlton soils. They are near the moderately well drained Sutton soils and the somewhat poorly drained and poorly drained Leicester soils. They are better drained and shallower over bedrock than the Sutton and Leicester soils.

Typical pedon of Chatfield loam, 3 to 8 percent slopes, in an area of Chatfield-Hollis-Rock outcrop complex, rolling; in the town of Cortlandt, in Westchester County, in a wooded area 75 feet south of Montrose Station Road, 0.2 mile west of the intersection of Montrose Station Road and Washington Street:

Oe—1 inch to 0; partially decomposed leaf and twig litter.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) loam; weak fine granular structure; friable; common very fine and fine and few medium and coarse roots; about 5 percent rock fragments; very strongly acid; abrupt smooth boundary.

AB—2 to 7 inches; dark brown (10YR 3/3) loam; weak medium subangular blocky structure; friable; common very fine to coarse roots; about 5 percent rock fragments; very strongly acid; clear smooth boundary.

Bw—7 to 24 inches; brown (7.5YR 4/4) flaggy silt loam; weak fine subangular blocky structure; friable; common fine to coarse and few medium roots; about 20 percent rock fragments; very strongly acid; abrupt smooth boundary.

R—24 inches; fractured granitic bedrock.

Thickness of the solum ranges from 16 to 36 inches. The depth to bedrock ranges from 20 to 40 inches. The content of rock fragments ranges from 5 to 35 percent throughout the profile.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. It is dominantly loam, but the range includes sandy loam in the fine-earth fraction. Reaction ranges from very strongly acid to moderately acid in areas that have not been limed.

The B horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 4 to 6. The texture ranges from silt loam to sandy loam in the fine-earth fraction. Reaction ranges from very strongly acid to moderately acid.

The C horizon, if it occurs, has hue of 7.5YR to 5Y, value of 4 or 5, and chroma of 2 to 4. The texture ranges from loam to sandy loam in the fine-earth fraction. Reaction ranges from very strongly acid to moderately acid.

Fluvaquents

Fluvaquents are very deep, somewhat poorly drained to very poorly drained soils that formed in recent alluvial deposits. These soils are in areas where the adjacent stream frequently shifts the soil from place to place through scouring, cutting, and lateral erosion. Consequently, the soils have little or no profile development. They are frequently flooded. Slopes range from 0 to 3 percent.

Fluvaquents are mapped with Udifluvents. They are near Riverhead, Knickerbocker, and Hinckley soils in major river valleys. They also occur near Paxton and Charlton soils. Riverhead, Knickerbocker, and Hinckley soils formed in outwash. They are on terraces and plains above the Fluvaquents. Paxton and Charlton soils formed in glacial till. They are in the uplands.

Because Fluvaquents vary considerably from place to place, a typical pedon is not described.

Thickness of the solum ranges from 1 to 15 inches and corresponds to the thickness of the A horizon. The depth to bedrock is generally more than 60 inches. The content of rock fragments, including pebbles and cobblestones, ranges from 0 to 80 percent, by volume.

Reaction ranges from very strongly acid to neutral throughout the profile. The organic matter content decreases irregularly with increasing depth.

The A horizon has hue of 7.5YR to 2.5Y or is neutral in hue. It has value of 2 to 6 and chroma of 0 to 6. It is sand to silty clay loam or the cobbly, gravelly, or very gravelly analogs of the textures within that range.

The C horizon has hue of 7.5YR to 2.5Y or is neutral in hue. It has value of 2 to 5 and chroma of 0 to 2. It has chroma of 3 or 4 in some subhorizons. It is commonly mottled. It is coarse sandy loam to silty clay loam or the cobbly, gravelly, or very gravelly analogs of the textures within that range. Consistence ranges from friable to loose.

Fredon Series

The Fredon series consists of very deep, poorly drained and somewhat poorly drained soils on outwash plains and terraces. These soils formed in outwash deposits derived from slate, sandstone, granite, and gneiss. Slopes range from 0 to 3 percent.

Fredon soils are in landscape positions similar to those of the Pompton, Leicester, Sun, and Palms soils and Fluvaquents. They have more low-chroma mottles than the Pompton soils. Leicester and Sun soils do not have stratified deposits of sand and gravel in the substratum. Fredon soils formed entirely in mineral material, but Palms soils have a layer of muck at the surface. Fluvaquents are flooded by adjacent streams.

Typical pedon of Fredon silt loam, in the town of North Salem, in Westchester County, 250 feet east and 250 feet south of the intersection of Route 138 and North Todd Road, in an idle field:

A1—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; very friable; common fine and medium roots; about 2 percent rock fragments; moderately acid; abrupt smooth boundary.

A2—7 to 10 inches; dark gray (10YR 4/1) silt loam; strong coarse granular structure; friable; few fine and very fine roots; about 2 percent rock fragments; moderately acid; abrupt smooth boundary.

Bw—10 to 13 inches; grayish brown (10YR 5/2) silt loam; common medium distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; common fine roots; about 2 percent rock fragments; moderately acid; clear smooth boundary.

Bg1—13 to 16 inches; gray (10YR 6/1) fine sandy loam; many medium distinct strong brown (7.5YR 4/6) and common medium distinct light yellowish brown (10YR 6/4) and brown (7.5YR 4/4) mottles; weak medium subangular blocky structure; friable; common fine roots; about 2 percent rock fragments; moderately acid; clear smooth boundary.

Bg2—16 to 20 inches; gray (10YR 5/1) fine sandy loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak coarse subangular blocky structure; friable; few fine roots; about 2 percent rock fragments; slightly acid; abrupt smooth boundary.

2BCg—20 to 24 inches; gray (10YR 5/1) loamy sand; common medium distinct yellowish brown (10YR 5/4) mottles; single grain; loose; about 5 percent rock fragments; neutral; abrupt smooth boundary.

3C—24 to 60 inches; gray (10YR 5/4) very gravelly loamy sand; single grain; loose; about 35 percent rock fragments; neutral.

Thickness of the solum ranges from 22 to 40 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges, by volume, from 2 to 15 percent in the A horizon, from 2 to 35 percent in the B horizon, and from 10 to 60 percent in the C horizon.

The A horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2. It is dominantly silt loam, but the range includes fine sandy loam, very fine sandy loam, or loam in the fine-earth fraction. Reaction ranges from moderately acid to neutral in areas that have not been limed.

The Bw and Bg horizons have hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 1 to 4. They are mottled. They are loam, fine sandy loam, very fine sandy loam, or silt loam in the fine-earth fraction. Reaction ranges from moderately acid to neutral.

The C horizon has hue of 5YR to 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 4. The texture ranges from sand to loamy fine sand in the fine-earth fraction. Reaction ranges from slightly acid to moderately alkaline.

Hinckley Series

The Hinckley series consists of very deep, excessively drained soils on the sides and tops of stream terraces and kames. These soils formed in water-deposited sands and pebbles derived mainly from granite rocks. Slopes range from 3 to 50 percent.

Hinckley soils are near Pompton, Fredon, Knickerbocker, and Riverhead soils and are in similar landscape positions. They are better drained than the Pompton and Fredon soils and are coarser textured than the Knickerbocker and Riverhead soils.

Typical pedon of Hinckley gravelly loamy sand, 15 to 25 percent slopes, in the town of North Castle, in

Westchester County, 0.2 mile west along Brookwood Road from the junction of the Bedford-Banksville Road, 75 feet south of the Brookwood Road:

A—0 to 3 inches; very dark grayish brown (10YR 3/2) gravelly loamy sand; weak fine granular structure; very friable; common fine roots; about 20 percent rock fragments; strongly acid; abrupt smooth boundary.

AB—3 to 7 inches; dark brown (10YR 3/3) gravelly loamy sand; single grain; very friable; many very fine and common fine roots; about 20 percent rock fragments; strongly acid; clear smooth boundary.

Bw—7 to 17 inches; dark yellowish brown (10YR 4/6) very gravelly loamy sand; single grain; loose; many very fine and common fine roots; about 40 percent rock fragments; strongly acid; clear wavy boundary.

2C1—17 to 31 inches; light olive brown (2.5Y 5/4) very gravelly sand; single grain; loose; common very fine and few fine and medium roots; about 40 percent rock fragments; moderately acid; gradual wavy boundary.

2C2—31 to 44 inches; light olive brown (2.5Y 5/4) very gravelly coarse sand; single grain; loose; few fine roots; about 40 percent rock fragments; moderately acid; clear wavy boundary.

3C3—44 to 49 inches; brown (10YR 5/3) coarse sand; single grain; loose; few fine roots; about 10 percent rock fragments; moderately acid; clear wavy boundary.

4C4—49 to 60 inches; brown (10YR 5/3) very gravelly coarse sand; single grain; loose; about 40 percent rock fragments; moderately acid.

Thickness of the solum ranges from 12 to 30 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 10 to 50 percent in the solum and from 35 to 60 percent in the substratum.

The Ap or A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 to 3. It is dominantly loamy sand, but the range includes very fine sandy loam to loamy coarse sand in the fine-earth fraction. Reaction ranges from extremely acid to moderately acid.

The upper part of the B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. The lower part has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 4 to 8. The texture of the B horizon ranges from gravelly loamy sand to very gravelly sand in the fine-earth fraction. Reaction ranges from extremely acid to moderately acid.

The C horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 2 to 8. The texture ranges from loamy fine sand to coarse sand in the fine-earth fraction. Reaction ranges from very strongly acid to moderately acid.

Hollis Series

The Hollis series consists of shallow, well drained or somewhat excessively drained soils on bedrock-controlled uplands. These soils are on the sides and tops of hills and in valleys. They formed in glacial till over highly fractured, folded, and tilted schist, granite, and gneiss bedrock. Slopes range from 3 to 60 percent.

Hollis soils are associated with the well drained, moderately deep Chatfield soils and areas of rock outcrop. They also are associated with the very deep, well drained Charlton soils, the moderately well drained Sutton soils, and the somewhat poorly drained and poorly drained Leicester soils on nearby landscapes.

Typical pedon of Hollis fine sandy loam, in an area of Hollis-Rock outcrop complex, very steep; in the town of Cortlandt, in Westchester County, 3,500 feet south on Route 6 and Route 202 from the intersection with Bear Mountain Bridge, 30 feet east of the road:

Oi—1 inch to 0; mixed twigs and leaves.

A—0 to 1 inch; dark brown (10YR 3/3) fine sandy loam; weak very fine granular structure; very friable; many very fine and fine roots; about 5 percent rock fragments; strongly acid; abrupt smooth boundary.

Bw—1 to 16 inches; dark yellowish brown (10YR 4/6) fine sandy loam; weak fine subangular blocky structure; friable; many fine roots; about 10 percent rock fragments; strongly acid.

R—16 inches; fractured and folded granitic bedrock.

Thickness of the solum and the depth to bedrock range from 10 to 20 inches. The content of rock fragments ranges, by volume, from 5 to 15 percent in the surface layer and from 5 to 35 percent in the subsoil.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 2 or 3. It is dominantly fine sandy loam, but the range includes sandy loam or loam in the fine-earth fraction. Reaction ranges from moderately acid to very strongly acid.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. The texture ranges from sandy loam to loam in the fine-earth fraction. Reaction ranges from moderately acid to very strongly acid.

Ipswich Series

The Ipswich series consists of very deep, very poorly drained soils that formed in deposits of organic material in an advanced stage of decomposition. These soils are

in tidal marshes and are subject to daily inundation by salt water. Slopes range from 0 to 2 percent.

Ipswich soils formed in material similar to that in which Carlisle and Palms soils formed. Carlisle and Palms soils are not subject to daily tidal flooding. Ipswich soils are deeper over the underlying mineral soil material than the Palms soils.

Typical pedon of Ipswich mucky peat, in Phillipstown, in Putnam County, 0.6 mile west along Manitou Road from the junction of Manitou Road and Route 9D, about 120 feet south of Manitou Road:

Oe—0 to 8 inches; very dark brown (10YR 3/1) mucky peat; about 70 percent fiber, 40 percent rubbed; dense mat of roots, stems, and leaves; nonsticky; many fine and very fine roots; herbaceous fibers; about 20 percent silt and very fine sand; strongly acid; abrupt smooth boundary.

Oa—8 to 20 inches; very dark gray (10YR 3/1) muck; about 20 percent fiber, 10 percent rubbed; massive; nonsticky; herbaceous fibers; about 60 percent silt and fine sand; strongly acid; abrupt smooth boundary.

O'e1—20 to 33 inches; very dark gray (10YR 3/1) mucky peat, black (10YR 2.5/1) rubbed; about 70 percent fiber, 20 percent rubbed; massive; slightly sticky; herbaceous fibers; about 15 percent silt and fine sand; strongly acid; clear smooth boundary.

O'e2—33 to 60 inches; very dark grayish brown (10YR 3/2) mucky peat; about 70 percent fiber, 25 percent rubbed; massive; nonsticky; herbaceous fibers; about 15 percent silt and fine sand; strongly acid.

The organic deposits are more than 51 inches thick. Some pedons have thin layers of very fine sand to silt. The content of mineral material ranges from 5 to 80 percent throughout the profile.

The surface tier has hue of 10YR to 5Y or is neutral in hue. It has value of 2 to 4 and chroma of 0 to 3. The content of fiber ranges from 35 to 100 percent unrubbed and from 20 to 75 percent rubbed. Reaction ranges from strongly acid to neutral.

The subsurface tier has hue of 10YR to 5Y or is neutral in hue. It has value of 2 to 4 and chroma of 0 to 3. The content of fiber ranges from 20 to 85 percent unrubbed and from 10 to 40 percent rubbed. Reaction ranges from strongly acid to neutral.

The bottom tier has hue of 10YR to 5Y or is neutral in hue. It has value of 2 to 4 and chroma of 0 to 3. The content of fiber ranges from 10 to 70 percent unrubbed but is less than 40 percent rubbed. Reaction ranges from strongly acid to neutral.

Knickerbocker Series

The Knickerbocker series consists of very deep, somewhat excessively drained soils on stream terraces and kames. These soils formed in water-deposited sands. Slopes range from 2 to 15 percent.

Knickerbocker soils are in landscape positions similar to those of the Hinckley, Riverhead, and Unadilla soils. They are less gravelly than the Hinckley soils and have less than 20 inches of fine sandy loam or finer textures in the upper part. They have more sand throughout than the Unadilla soils, which are dominantly silt loam and very fine sandy loam.

Typical pedon of Knickerbocker fine sandy loam, 8 to 15 percent slopes, in the town of Greenburgh, in Westchester County, 240 yards west of the intersection of Route 9 and the entrance to the General Foods Corporation Research Center, 10 yards south, in an abandoned lawn:

Ap—0 to 9 inches; dark brown (10YR 3/3) fine sandy loam; weak very fine granular structure; very friable; many very fine roots; very strongly acid; abrupt smooth boundary.

Bw1—9 to 19 inches; yellowish brown (10YR 5/6) fine sandy loam; weak medium subangular blocky structure; very friable; common very fine roots; strongly acid; clear wavy boundary.

Bw2—19 to 31 inches; dark yellowish brown (10YR 4/4) loamy fine sand; weak coarse subangular blocky structure; very friable; few very fine roots; strongly acid; clear wavy boundary.

C—31 to 60 inches; yellowish brown (10YR 5/4) loamy fine sand; single grain; loose; moderately acid.

Thickness of the solum ranges from 25 to 44 inches. The depth to bedrock is more than 60 inches. The content of rounded rock fragments ranges from 0 to 10 percent, by volume, throughout the profile.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4. Some pedons have a thin A horizon, which has value of 2 or 3 and chroma of 1 or 2. The Ap horizon is dominantly fine sandy loam, but the range includes sandy loam in the fine-earth fraction. Reaction ranges from very strongly acid to moderately acid in areas that have not been limed.

The B horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 to 6. The texture of the fine-earth fraction ranges from sandy loam to fine sandy loam to a depth of 20 inches and is loamy fine sand or loamy sand below this depth. Reaction ranges from very strongly acid to moderately acid in areas that have not been limed. Some pedons have a BC horizon, which is as much as 12 inches thick.

The C horizon has hue of 10YR to 2.5Y, value of 3 to

5, and chroma of 2 to 4. The texture of the fine-earth fraction ranges from loamy fine sand to sand. Reaction ranges from very strongly acid to moderately acid.

Leicester Series

The Leicester series consists of very deep, somewhat poorly drained and poorly drained soils that formed in glacial till. These soils are on till plains, along small drainageways, and on the lower slopes of hillsides in the uplands. Slopes range from 0 to 8 percent.

Leicester soils are near the moderately well drained Sutton soils and the well drained Charlton soils in the uplands. In the flatter areas, they are near the poorly drained or very poorly drained Sun soils.

Typical pedon of Leicester loam, 0 to 3 percent slopes, stony; 0.4 mile north of the intersection of Anderson Hill Road and Camps Road, in the SUNY-Purchase, in the town of Harrison, in Westchester County:

A—0 to 8 inches; very dark grayish brown (10YR 3/2) loam; weak very fine granular structure; friable; few medium and coarse and many fine roots; about 5 percent rock fragments; very strongly acid; abrupt wavy boundary.

Bw1—8 to 18 inches; dark grayish brown (10YR 4/2) sandy loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; common very fine and few medium roots; about 5 percent rock fragments; very strongly acid; clear wavy boundary.

Bw2—18 to 26 inches; brown (10YR 4/3) sandy loam; common medium distinct yellowish brown (10YR 5/6) and grayish brown (10YR 5/2) mottles; common medium prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine roots; about 5 percent rock fragments; very strongly acid; abrupt wavy boundary.

C—26 to 60 inches; brown (10YR 4/3) sandy loam; common coarse distinct yellowish brown (10YR 5/6) and gray (10YR 6/1) and common coarse prominent strong brown (7.5YR 5/6) mottles; weak medium and thick platy structure; firm; about 10 percent rock fragments; strongly acid.

Thickness of the solum ranges from 20 to 36 inches. The content of rock fragments ranges from 5 to 15 percent in the A horizon and from 5 to 35 percent in the B horizon. It ranges from 10 to 35 percent in the C horizon above a depth of 40 inches and from 10 to 50 percent below that depth. The depth to bedrock is more than 60 inches.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is dominantly loam, but the range includes very fine sandy loam, loam, or fine sandy loam in the fine-earth fraction. Reaction is very strongly acid or strongly acid.

The B horizon has hue of 5Y to 10YR and value of 4 to 6. It has chroma of 1 or 2 in the upper part and 1 to 4 in the lower part. It has distinct or prominent mottles. The texture of the fine-earth fraction is loam, fine sandy loam, or sandy loam. Reaction is very strongly acid or strongly acid.

The C horizon has hue of 5Y to 7.5YR, value of 4 to 6, and chroma of 1 to 4. The texture of the fine-earth fraction is fine sandy loam or sandy loam. Reaction is very strongly acid or strongly acid above a depth of 40 inches but may range to moderately acid below that depth.

Palms Series

The Palms series consists of very deep, very poorly drained soils in broad depressional or basinlike swamps and bogs. These soils formed in highly decomposed organic material 16 to 51 inches deep over mineral deposits. Slopes range from 0 to 2 percent.

Palms soils formed in material similar to that in which Carlisle and Ipswich soils formed. They formed in thinner deposits of organic material than the Carlisle and Ipswich soils, which have organic deposits more than 51 inches thick. Ipswich soils are subject to daily tidal flooding.

Typical pedon of Palms muck, in the town of Patterson, in Putnam County, 150 feet south of the Patterson Town Park sign, in a wooded area of the park, adjacent to the East Branch Croton River:

Oa1—0 to 10 inches; muck, very dark brown (10YR 2/2) rubbed and pressed; about 5 percent fibers unrubbed, 1 percent rubbed; weak medium granular structure; nonsticky; primarily herbaceous fibers; many fine roots; slightly acid; gradual smooth boundary.

Oa2—10 to 34 inches; muck, black (10YR 2/1) broken face, rubbed, and pressed; about 15 percent fibers, less than 5 percent rubbed; massive; nonsticky; common fine roots; primarily herbaceous fibers; neutral; gradual smooth boundary.

Oa3—34 to 48 inches; muck, dark brown (7.5YR 3/2) rubbed and pressed; about 15 percent fibers, less than 5 percent rubbed; massive; nonsticky; primarily herbaceous fibers; about 20 percent sand and mica material; mildly alkaline; abrupt smooth boundary.

2C—48 to 61 inches; dark gray (10YR 4/1 and 2.5Y 4/1) loam; massive; friable; neutral.

The depth to bedrock is more than 60 inches. The organic material is 16 to 51 inches deep over contrasting mineral material. Varying amounts of undecomposed plant remains, some of which are woody, are in the profile. Reaction ranges from strongly acid to mildly alkaline throughout the profile.

The surface tier has hue of 5YR to 10YR or is neutral in hue. It has value of 2 and chroma of 0 to 2. It is dominantly sapric material, but in some pedons it contains hemic material.

The subsurface tier has hue of 5YR to 10YR or is neutral in hue. It has value of 2 to 4 and chroma of 0 to 3. It is dominantly sapric material, but in some pedons it has thin layers of hemic material.

The bottom tier has hue of 5YR to 10YR or is neutral in hue. It has value of 2 to 4 and chroma of 0 to 3. It is dominantly sapric material, but in some pedons it has thin layers of hemic material.

The 2C horizon has hue of 10YR or 2.5Y, value of 3 to 7, and chroma of 1 or 2. It is fine sandy loam, loam, silt loam, or silty clay loam in the fine-earth fraction.

Paxton Series

The Paxton series consists of very deep, well drained soils that formed in dense glacial till. These soils are on broad ridges and hills in glaciated uplands. Slopes range from 2 to 25 percent.

Paxton soils are in a drainage sequence with the moderately well drained Woodbridge soils, the somewhat poorly drained and poorly drained Ridgebury soils, and the poorly drained or very poorly drained Sun soils. They are in the same drainage class as the Charlton soils, but they have a more firm, dense substratum. They also are near the moderately deep Chatfield soils on bedrock-controlled landscapes.

Typical pedon of Paxton fine sandy loam, 2 to 8 percent slopes, 550 yards north along June Road from the intersection of June Road and Baxter Road, 200 yards east in an idle pasture, in the town of North Salem, in Westchester County:

Ap—0 to 10 inches; dark brown (10YR 3/3) fine sandy loam; weak fine granular structure; friable; common very fine and fine roots; about 5 percent rock fragments; moderately acid; abrupt smooth boundary.

Bw1—10 to 17 inches; dark yellowish brown (10YR 4/6) loam; weak moderate subangular blocky structure; friable; few very fine and fine roots; about 5 percent rock fragments; moderately acid; abrupt smooth boundary.

Bw2—17 to 20 inches; olive brown (2.5Y 4/4) sandy loam; weak fine subangular blocky structure; friable; few very fine roots; about 5 percent rock fragments; moderately acid; abrupt smooth boundary.

Cd1—20 to 25 inches; olive brown (2.5Y 4/4) sandy loam; moderate thin platy structure; firm; about 10 percent rock fragments; moderately acid; clear smooth boundary.

Cd2—25 to 60 inches; dark grayish brown (2.5Y 4/2) gravelly sandy loam; moderate very thin platy structure; very firm; about 20 percent rock fragments; moderately acid.

Thickness of the solum ranges from 18 to 38 inches. The content of rock fragments ranges from 5 to 15 percent in the surface layer, from 5 to 35 percent in the subsoil, and from 5 to 40 percent in the substratum. The depth to bedrock is more than 60 inches. Reaction ranges from very strongly acid to moderately acid throughout the profile.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. It is dominantly fine sandy loam, but the range includes loam or sandy loam in the fine-earth fraction.

The upper part of the B horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. The lower part has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 to 6. The texture of the fine-earth fraction is loam, fine sandy loam, or sandy loam.

The Cd horizon has hue of 2.5Y or 5Y, value of 4 to 6, and chroma of 2 to 4. The texture of the fine-earth fraction is loam, fine sandy loam, sandy loam, or coarse sandy loam.

Pompton Series

The Pompton series consists of very deep, moderately well drained or somewhat poorly drained soils on stream terraces and outwash plains. These soils formed in water-sorted, sandy and gravelly material dominantly of granitic origin. Slopes range from 0 to 3 percent.

Pompton soils are near Riverhead, Hinckley, Knickerbocker, and Fredon soils but are in slightly lower positions on the landscape. They are wetter than the Riverhead, Hinckley, and Knickerbocker soils but are better drained than the Fredon soils.

Typical pedon of Pompton silt loam, loamy substratum, in Phillipstown, in Putnam County, 100 yards south of the Dutchess County line, 100 yards west of New York Route 9:

Ap—0 to 8 inches; dark brown (7.5YR 3/2) silt loam; moderate medium granular structure; friable; few coarse and many fine roots; about 5 percent gravel; very strongly acid; clear smooth boundary.

Bw1—8 to 15 inches; yellowish brown (10YR 5/6) fine sandy loam; weak medium subangular blocky

structure; friable; common medium and fine roots; common medium vesicular and few medium tubular pores; about 10 percent gravel; strongly acid; clear smooth boundary.

Bw2—15 to 21 inches; yellowish brown (10YR 5/4) gravelly fine sandy loam; common coarse faint brown (10YR 5/3) mottles; weak coarse and medium subangular blocky structure; friable; few medium and fine roots; few medium and common fine tubular pores and many medium and fine vesicular pores; about 15 percent gravel; strongly acid; clear wavy boundary.

Bw3—21 to 26 inches; light olive brown (2.5Y 5/4) gravelly sandy loam; common medium and coarse distinct grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; friable; few fine roots; many medium vesicular pores; about 20 percent gravel; strongly acid; clear wavy boundary.

2C1—26 to 44 inches; dark yellowish brown (10YR 4/4) and dark brown (10YR 4/3) very gravelly loamy sand; single grain; about 50 percent gravel; moderately acid; clear wavy boundary.

2C2—44 to 50 inches; dark yellowish brown (10YR 4/4) and brown (10YR 5/3) gravelly sand; single grain; about 15 percent gravel; moderately acid; abrupt wavy boundary.

3C3—50 to 60 inches; yellowish brown (10YR 5/4) gravelly loam; common coarse distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/8) mottles; massive; friable; about 25 percent gravel; moderately acid.

Thickness of the solum ranges from 24 to 36 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges, by volume, from 0 to 35 percent in the solum and from 0 to 75 percent in the C horizon.

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 or 3. It is dominantly silt loam, but the range includes loam or sandy loam in the fine-earth fraction. Reaction is very strongly acid or strongly acid.

The B horizon has hue of 7.5Y, 10YR, or 2.5Y, value of 4 or 5, and chroma of 4 to 6. Mottles that have chroma of 2 or less occur only below a depth of 15 inches. The B horizon is fine sandy loam or sandy loam in the fine-earth fraction. Reaction is very strongly acid or strongly acid.

The C horizon has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 2 to 4. It ranges from silt loam to sandy loam or sand in the fine-earth fraction. Reaction is strongly acid or moderately acid.

The Pompton soils in this survey area contain more silt and less sand and gravel in the lower part of the C horizon than is typical for the series.

Raynham Series

The Raynham series consists of very deep, poorly drained soils that formed in lacustrine deposits of silts and very fine sands. These soils are on nearly level terraces in the valleys along rivers and in slight depressions in the uplands. Slopes range from 0 to 3 percent.

Raynham soils are near the excessively drained Hinckley soils, the somewhat excessively drained Knickerbocker soils, and the well drained Riverhead soils in valleys. In depressional areas on uplands, they are near Sun, Leicester, and Ridgebury soils, which formed in glacial till. They are in a drainage sequence with the well drained Unadilla soils.

Typical pedon of Raynham silt loam, in the town of Bedford, in Westchester County, in a wooded area south of Bedford Center Road, 300 feet west of the first large oak tree and south along the estate driveway intersecting Bedford Center Road, 1,000 feet west of the I-684 overpass:

Ap—0 to 12 inches; dark brown (10YR 3/3) silt loam; weak medium and coarse granular structure; friable; many fine and common medium and coarse roots; strongly acid; abrupt smooth boundary.

Bw1—12 to 17 inches; olive brown (2.5Y 4/4) silt loam; many medium distinct gray (10YR 6/1) and common medium distinct yellowish brown (10YR 5/6) and yellowish red (5YR 4/6) mottles; weak medium and coarse subangular blocky structure; friable; many fine and few medium roots; moderately acid; clear wavy boundary.

Bw2—17 to 32 inches; silt loam, about 55 percent gray (10YR 6/1) and 30 percent light olive brown (2.5Y 5/4); grayish brown (2.5Y 5/2) ped faces; common medium distinct yellowish brown (10YR 5/6) mottles; weak very coarse blocky structure; friable; few fine roots; slightly acid; clear wavy boundary.

C1—32 to 42 inches; brown (10YR 4/3) silt loam; common medium distinct gray (10YR 6/1) and yellowish brown (10YR 5/6) mottles; massive; friable; slightly acid; clear wavy boundary.

C2—42 to 60 inches; olive (5Y 5/3) very fine sandy loam; few medium prominent yellowish brown (10YR 5/6) mottles; massive; friable; neutral.

Thickness of the solum ranges from 16 to 37 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges from 0 to 2 percent, by volume.

The A horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 to 3. It is dominantly silt loam, but the range includes silt or very fine sandy loam. Reaction ranges from strongly acid to neutral.

The B horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. It has distinct or prominent mottles. It is silt loam, silt, or very fine sandy loam. Reaction ranges from strongly acid to neutral.

The C horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 3. It is silt loam, silt, or very fine sandy loam. Reaction ranges from moderately acid to mildly alkaline.

Ridgebury Series

The Ridgebury series consists of very deep, somewhat poorly drained and poorly drained soils that formed in glacial till. These soils are on parts of glaciated uplands and the lower parts of hillsides. Slopes range from 0 to 8 percent.

Ridgebury soils are near the moderately well drained Woodbridge soils and the well drained Paxton soils in the uplands. They are near the poorly drained or very poorly drained Sun soils on hillsides.

Typical pedon of Ridgebury loam, 2 to 8 percent slopes, very stony, 500 feet northwest of the junction of Concordia and Vineland Roads, 200 feet west of Concordia Road, in the town of Carmel, in Putnam County:

A—0 to 8 inches; very dark grayish brown (10YR 3/2) loam; moderate medium and fine granular structure; friable; many fine, common medium, and few coarse roots; about 10 percent rock fragments; moderately acid; abrupt wavy boundary.

Bw—8 to 16 inches; brown (10YR 5/3) gravelly fine sandy loam; common fine distinct light brownish gray (10YR 6/2) and dark yellowish brown (10YR 4/4) and few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable; common fine and few medium roots; common fine and medium tubular pores; about 15 percent rock fragments; slightly acid; clear wavy boundary.

Bg—16 to 26 inches; grayish brown (2.5Y 5/2) gravelly fine sandy loam; few pockets of sandy loam; common medium distinct yellowish brown (10YR 5/6) and many coarse faint light olive brown (2.5Y 5/4) mottles; weak medium subangular blocky structure; friable; few fine roots; common fine and medium tubular pores; about 15 percent rock fragments; slightly acid; clear wavy boundary.

Cd1—26 to 34 inches; light olive brown (2.5Y 5/4) gravelly fine sandy loam; common coarse faint grayish brown (2.5Y 5/2) and few medium distinct olive yellow (2.5Y 6/6) mottles; massive; firm; few fine and medium tubular pores; about 20 percent rock fragments; slightly acid; gradual wavy boundary.

Cd2—34 to 60 inches; olive brown (2.5Y 4/4) gravelly loam; few medium distinct brownish yellow (10YR 6/6) mottles; massive; firm; few fine and medium tubular pores; about 20 percent rock fragments; slightly acid.

Thickness of the solum ranges from 14 to 30 inches. The content of rock fragments ranges from 5 to 15 percent in the surface layer and from 5 to 35 percent, by volume, in the subsoil and substratum. The depth to bedrock is more than 60 inches.

The A horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2. It is dominantly loam, but the range includes fine sandy loam or sandy loam in the fine-earth fraction. Reaction ranges from very strongly acid to moderately acid.

The B horizon has hue of 10YR to 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 3. It is loam, fine sandy loam, or sandy loam in the fine-earth fraction. Reaction ranges from very strongly acid to slightly acid.

The C horizon has hue of 10YR to 5Y, value of 3 to 6, and chroma of 1 to 4. It is loam, fine sandy loam, or sandy loam in the fine-earth fraction. Reaction ranges from very strongly acid to slightly acid.

Riverhead Series

The Riverhead series consists of very deep, well drained soils on stream terraces and outwash plains. These soils formed in sandy or gravelly deposits underlain by stratified sand and gravel. Slopes range from 0 to 50 percent.

Riverhead soils are near Hinckley, Knickerbocker, Pompton, and Fredon soils. They have less gravel in the solum than the Hinckley soils and have more gravel throughout than the sandy Knickerbocker soils. They are better drained than the Hinckley and Knickerbocker soils. Pompton and Fredon soils have mottles.

Typical pedon of Riverhead loam, 3 to 8 percent slopes, in the town of Bedford, in Westchester County, 0.4 mile west along Clinton Road, 75 feet east of the road:

Oe—1 inch to 0; partially decomposed leaf and twig litter.

Ap—0 to 6 inches; dark brown (10YR 3/3) loam, pale brown (10YR 6/3) dry; weak fine granular structure; friable; common fine and medium roots; less than 5 percent rock fragments; very strongly acid; gradual smooth boundary.

AB—6 to 14 inches; dark brown (10YR 3/3) sandy loam, pale brown (10YR 6/3) dry; weak fine subangular blocky structure; friable; common very fine, fine, and medium and few coarse roots; less than 5 percent rock fragments; strongly acid; clear smooth boundary.
Bw1—14 to 19 inches; dark yellowish brown (10YR 4/6) sandy loam; weak medium subangular blocky structure; friable; common fine roots; about 5 percent rock fragments; strongly acid; gradual smooth boundary.
Bw2—19 to 25 inches; dark yellowish brown (10YR 4/6) sandy loam; weak fine and medium subangular blocky structure; friable; common fine roots; about 5 percent rock fragments; strongly acid; abrupt smooth boundary.
2BC—25 to 30 inches; yellowish brown (10YR 5/4) loamy sand; massive; loose; few fine roots; about 5 percent gravel; moderately acid; gradual wavy boundary.
2C—30 to 60 inches; brown (10YR 4/3) loamy sand; single grain; loose; about 5 percent gravel; moderately acid.

Thickness of the solum ranges from 20 to 40 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges, by volume, from 0 to 10 percent in the A horizon, from 5 to 35 percent in the B horizon, and from 5 to 40 percent in the C horizon.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 or 3. It is dominantly loam, but the range includes fine sandy loam or sandy loam in the fine-earth fraction. Reaction ranges from very strongly acid to moderately acid in areas that have not been limed.

The AB horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 or 3. It is loam, fine sandy loam, or sandy loam in the fine-earth fraction. Reaction ranges from very strongly acid to moderately acid in areas that have not been limed.

The B horizon has hue of 7.5YR or 10YR and value and chroma of 4 to 6. It is sandy loam or fine sandy loam in the fine-earth fraction. Reaction ranges from very strongly acid to moderately acid.

The 2BC horizon has hue of 7.5YR to 2.5Y and value and chroma of 4 to 6. It is sandy loam or loamy sand in the fine-earth fraction. Reaction ranges from very strongly acid to moderately acid.

The C or 2C horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 3 to 6. It is sand or loamy sand in the fine-earth fraction or is stratified sand and gravel. Reaction ranges from very strongly acid to moderately acid.

Stockbridge Series

The Stockbridge series consists of very deep, well drained soils that formed in loamy glacial till derived mainly from limestone, marble, and schist. These soils are on glaciated uplands. Slopes range from 2 to 35 percent but are dominantly 2 to 15 percent.

Stockbridge soils formed in material similar to that in which Charlton, Paxton, Woodbridge, and Sutton soils formed. They are less acid than these soils. They have a substratum that is less firm and dense than that in the Paxton and Woodbridge soils.

Typical pedon of Stockbridge silt loam, 8 to 15 percent slopes, in the town of Patterson, in Putnam County, 4,500 feet east on Birch Hill Road from the intersection of Birch Hill Road and New York Route 22, about 550 feet south:

Ap—0 to 12 inches; dark brown (10YR 3/3) silt loam, light yellowish brown (2.5Y 6/4) dry and crushed; weak medium granular structure; friable; many fine and few medium roots; about 10 percent rock fragments; slightly acid; abrupt smooth boundary.
Bw1—12 to 16 inches; dark brown (10YR 4/3) silt loam; moderate medium subangular blocky structure; friable; about 10 percent rock fragments; slightly acid; clear smooth boundary.
Bw2—16 to 36 inches; dark yellowish brown (10YR 4/6) silt loam; moderate medium subangular blocky structure; firm; few fine roots in the upper part; about 10 percent rock fragments; slightly acid; gradual smooth boundary.
C—36 to 60 inches; dark brown (10YR 3/3) gravelly silt loam; many medium faint dark yellowish brown (10YR 4/4) and few fine prominent olive gray (5Y 4/2) mottles; massive; firm; about 15 percent rock fragments; neutral.

Thickness of the solum ranges from 20 to 36 inches. The content of rock fragments ranges from 5 to 15 percent in the surface layer, from 5 to 35 percent in the subsoil, and from 5 to 50 percent in the substratum. The depth to bedrock is more than 60 inches.

The Ap horizon has hue of 10YR, value of 2 to 4, and chroma of 1 to 3. It is dominantly silt loam, but the range includes very fine sandy loam to silt loam. Reaction ranges from strongly acid to neutral.

The B horizon has hue of 10YR to 2.5Y, value of 4 to 6, and chroma of 3 to 7. It is loam or silt loam. Reaction ranges from moderately acid to neutral in the upper part and from moderately acid to mildly alkaline in the lower part.

The C horizon has hue of 10YR to 5Y, value of 3 to 6, and chroma of 2 to 4. In some pedons it has faint mottles below a depth of 30 inches. It is loam or silt

loam or the gravelly analogs of those textures above a depth of 40 inches and loam, silt loam, fine sandy loam, or the gravelly analogs of those textures below that depth. Reaction ranges from slightly acid to moderately alkaline.

Sun Series

The Sun series consists of very deep, poorly drained and very poorly drained soils in nearly level areas or in depressions on till plains. These soils formed in glacial till derived from granite, gneiss, and schist. Slopes range from 0 to 3 percent.

Sun soils are near the somewhat poorly drained and poorly drained Leicester and Ridgebury soils and are in similar landscape positions. They are wetter than the Leicester and Ridgebury soils. Also, they have a substratum that is less dense than that in the Ridgebury soils. They are adjacent to the poorly drained Palms and Carlisle soils in the larger depressions. They are better drained than the Palms and Carlisle soils. Palms and Carlisle soils formed in organic material.

Typical pedon of Sun loam, in Yorktown, in Westchester County, 50 yards east of Gomer Street, 400 yards north of the intersection of Gomer Street and Alden Road:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) loam, light brownish gray (10YR 6/2) dry; moderate medium and coarse granular structure; friable; many medium and fine roots; about 5 percent rock fragments; slightly acid; abrupt wavy boundary.

Bg—9 to 19 inches; loam that is gray (10YR 6/1) on the faces of peds and grayish brown (10YR 5/2) in the matrix; common medium prominent strong brown (7.5YR 5/6) and common medium faint brown (10YR 5/3) mottles; weak medium subangular blocky structure; friable; common medium and fine roots; common medium and fine vesicular pores; about 10 percent rock fragments; neutral; gradual wavy boundary.

Bw—19 to 27 inches; brown (10YR 5/3) gravelly fine sandy loam; common fine and medium distinct strong brown (7.5YR 5/6) and common medium distinct light brownish gray (2.5Y 6/2) mottles; weak medium subangular blocky structure; friable; few medium roots; common medium and fine vesicular pores; about 15 percent rock fragments; neutral; clear wavy boundary.

C1—27 to 40 inches; brown (10YR 5/3) gravelly sandy loam; common medium distinct gray (10YR 5/1) and few fine distinct strong brown (7.5YR 5/6) mottles; massive; firm; about 25 percent rock fragments; neutral; gradual wavy boundary.

C2—40 to 61 inches; light olive brown (2.5Y 5/4) gravelly fine sandy loam; massive; firm; about 30 percent rock fragments; neutral.

Thickness of the solum ranges from 20 to 40 inches. The content of rock fragments ranges from 0 to 15 percent in the surface layer, from 0 to 35 percent in the subsoil, and from 20 to 50 percent in the substratum. The depth to bedrock is more than 60 inches.

The A horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2. It is dominantly loam, but the range includes silt loam, loam, fine sandy loam, or sandy loam. Reaction ranges from strongly acid to slightly acid.

The Bg horizon has hue of 10YR to 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. It has common or many mottles. It is silt loam, loam, fine sandy loam, or sandy loam in the fine-earth fraction. Reaction ranges from moderately acid to neutral.

The Bw horizon has hue of 7.5YR to 5Y, value of 3 to 5, and chroma of 2 to 4. It has low- and high-chroma mottles. It is loam, fine sandy loam, or sandy loam in the fine-earth fraction. Reaction ranges from moderately acid to neutral.

The C horizon has hue of 7.5YR to 5Y, value of 3 to 5, and chroma of 2 to 4. It is loam, fine sandy loam, or sandy loam in the fine-earth fraction. Reaction ranges from slightly acid to mildly alkaline.

Sutton Series

The Sutton series consists of very deep, moderately well drained soils that formed in gravelly glacial till derived mainly from granite, schist, and gneiss. These soils are on the lower concave side slopes, in slight depressions, and along drainageways in the uplands. Slopes range from 0 to 8 percent.

Sutton soils formed in material similar to that in which Charlton and Leicester soils formed. They are near Hollis, Chatfield, and Sun soils. They are less well drained than the Charlton soils and are deeper over bedrock than the Hollis and Chatfield soils. They are better drained than the Leicester and Sun soils. Leicester and Sun soils have a darker surface layer and a grayer B horizon than the Sutton soils.

Typical pedon of Sutton loam, 3 to 8 percent slopes, in the town of Mount Pleasant, in Westchester County; 0.3 mile south (by 10 degrees west) of the intersection of Route 120 and Nanny Hagen Road, 120 feet west of a reservoir, 25 feet south of a small drainageway:

A—0 to 2 inches; dark brown (7.5YR 3/2) loam; moderate medium and fine granular structure; friable; common fine and medium roots; about 10 percent rock fragments; very strongly acid; abrupt smooth boundary.

AB—2 to 9 inches; dark brown (10YR 4/3) loam; weak medium subangular blocky structure; friable; common medium and few fine and coarse roots; about 10 percent rock fragments; very strongly acid; clear smooth boundary.

Bw1—9 to 17 inches; dark brown (7.5YR 4/4) gravelly loam; weak medium subangular blocky structure parting to moderate fine granular; friable; few fine and medium roots; common fine and few medium vesicular pores and few medium and coarse tubular pores; about 20 percent rock fragments; very strongly acid; clear wavy boundary.

Bw2—17 to 26 inches; dark yellowish brown (10YR 4/4) gravelly fine sandy loam; common medium distinct light brownish gray (10YR 6/2) and common medium and coarse distinct strong brown (7.5YR 5/6 and 5/8) mottles; weak coarse subangular blocky structure; friable; few fine roots; common fine and medium vesicular pores and few medium and coarse tubular pores; about 25 percent rock fragments; very strongly acid; abrupt wavy boundary.

C1—26 to 38 inches; dark grayish brown (2.5Y 4/2) gravelly sandy loam; common medium and coarse strong brown (7.5YR 5/6) mottles; massive; firm; few fine and medium vesicular pores; about 30 percent rock fragments; strongly acid; clear wavy boundary.

C2—38 to 60 inches; dark brown (10YR 4/3) gravelly fine sandy loam; few medium and coarse strong brown (7.5YR 5/6) mottles; massive; friable; few medium vesicular pores; about 25 percent rock fragments; moderately acid.

Thickness of the solum ranges from 20 to 38 inches. The depth to bedrock is commonly more than 6 feet. The content of rock fragments ranges from 5 to 15 percent in the surface layer, from 5 to 35 percent to a depth of 40 inches, and from 5 to 50 percent below that depth. Reaction ranges from very strongly acid to moderately acid throughout the profile.

The A horizon has hue of 10YR or 7.5YR, value of 2 to 4, and chroma of 1 to 3. It is dominantly loam, but the range includes sandy loam, fine sandy loam, or loam in the fine-earth fraction.

The upper part of the B horizon has hue of 7.5YR or 10YR and value and chroma of 4 to 6. The lower part has hue of 10YR to 5Y and value and chroma of 4 to 6. It has high- and low-chroma mottles above a depth of 24 inches. The B horizon is sandy loam, fine sandy loam, or loam.

The C horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 to 4. It is dominantly sandy loam or fine sandy loam, but the range includes very fine sandy loam in the fine-earth fraction. In some pedons this horizon has pockets or thin lenses of silt loam, loamy sand, or sand.

Udifluvents

Udifluvents are very deep, moderately well drained and well drained soils that formed in recent alluvial deposits. These soils are adjacent to streams and are frequently flooded. Slopes range from 0 to 3 percent.

Udifluvents are mapped with Fluvaquents. They are near Riverhead, Knickerbocker, and Hinckley soils in major river valleys and commonly occur near Paxton and Charlton soils in upland areas. They are in areas where the adjacent stream frequently shifts the soil from place to place through scouring, cutting, and lateral erosion.

Because Udifluvents vary considerably from place to place, a typical pedon is not described.

Thickness of the solum ranges from 1 to 20 inches and corresponds to the thickness of the A horizon. The depth to bedrock is generally more than 60 inches. The content of rock fragments, mainly pebbles and cobblestones, ranges from 0 to 80 percent, by volume. Reaction ranges from very strongly acid to neutral throughout the profile.

The A horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 2 to 6. It is sand to silty clay loam or the cobbly, gravelly, or very gravelly analogs of the textures within that range.

The C horizon mainly has hue of 7.5YR to 2.5Y, value of 3 to 7, and chroma of 2 to 8. In some pedons it has high- and low-chroma mottles at a depth of 18 to 24 inches. It is coarse sandy loam to silty clay loam or the cobbly, gravelly, or very gravelly analogs of the textures within that range. Consistence ranges from friable to loose.

Udorthents

Udorthents consist of very deep, excessively drained to somewhat poorly drained soils that have been disturbed, generally by cutting or filling, in areas of urban development. These soils are on glacial till plains, outwash plains, terraces, and flood plains. Slopes range from 0 to 15 percent.

Udorthents are near Hollis, Sun, Fredon, Raynham, and Palms soils. These associated soils have not been disturbed and have natural soil horizons.

Because Udorthents vary considerably from place to place, a typical pedon is not described.

These soils do not have distinct horizons. They are characterized by stratified textures. The depth to bedrock is more than 60 inches. The content of rock fragments, which range in size from pebbles to

boulders, ranges from 0 to 60 percent, by volume. The texture ranges from silt loam to sand in the fine-earth fraction. Reaction ranges from very strongly acid to mildly alkaline.

Unadilla Series

The Unadilla series consists of very deep, well drained soils that formed in water-laid deposits of silt and very fine sand. These soils are on nearly level terraces in the valleys along rivers. Slopes range from 2 to 6 percent.

Unadilla soils are near Hinckley, Knickerbocker, and Riverhead soils. Hinckley, Knickerbocker, and Riverhead soils are slightly higher on the landscape than the Unadilla soils. Also, they contain more sand and gravel. Unadilla soils are also near the moderately well drained and somewhat poorly drained Pompton soils and the poorly drained Raynham soils. Pompton and Raynham soils are lower on the landscape than the Unadilla soils.

Typical pedon of Unadilla silt loam, 2 to 6 percent slopes, in the town of Greenburgh, in Westchester County, 200 yards west of the intersection of New York Route 9 and the entrance to the General Foods Corporation Research Center, 50 yards south, in an abandoned formal garden:

A1—0 to 2 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; very friable; common fine and medium roots; slightly acid; abrupt smooth boundary.

A2—2 to 7 inches; dark brown (10YR 3/3) silt loam; moderate fine subangular blocky structure; friable; common medium and fine roots; slightly acid; clear smooth boundary.

AB—7 to 13 inches; brown (10YR 4/3) very fine sandy loam; moderate fine subangular blocky structure; friable; common medium roots; slightly acid; clear smooth boundary.

Bw—13 to 28 inches; dark yellowish brown (10YR 4/4) very fine sandy loam; moderate medium subangular blocky structure; friable; common medium roots; moderately acid; gradual wavy boundary.

BC—28 to 32 inches; light olive brown (2.5Y 5/4) very fine sandy loam; massive; friable; moderately acid; clear smooth boundary.

C—32 to 60 inches; yellowish brown (10YR 5/4) very fine sandy loam; common fine faint light olive brown (2.5Y 5/4) mottles; massive; friable; moderately acid.

Thickness of the solum ranges from 20 to 50 inches. The depth to bedrock or to strongly contrasting material is more than 40 inches. The content of rock fragments ranges from 0 to 5 percent in the solum and from 0 to 60 percent in the substratum.

The A horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4. It is dominantly silt loam, but the range includes very fine sandy loam. Reaction ranges from very strongly acid to moderately acid in areas that have not been limed and is slightly acid in areas that have been limed.

The B horizon has hue of 7.5YR to 2.5Y and value and chroma of 4 to 6. It is silt loam or very fine sandy loam. Reaction ranges from very strongly acid to moderately acid.

The C horizon has hue of 7.5YR to 5Y, value of 4 or 5, and chroma of 2 to 4. It is silt loam or very fine sandy loam above a depth of 40 inches and ranges from silty clay loam to very gravelly sand below that depth. Consistence ranges from loose to firm. Reaction ranges from strongly acid to mildly alkaline.

Woodbridge Series

The Woodbridge series consists of very deep, moderately well drained soils on uplands. These soils formed in compact glacial till derived from schist, gneiss, and granite. Slopes range from 0 to 15 percent.

Woodbridge soils formed in material similar to that in which Paxton, Ridgebury, and Sun soils formed. They are wetter than the Paxton soils but are not so wet as the Ridgebury and Sun soils. They have a denser substratum than the Sun soils.

Typical pedon of Woodbridge loam, 8 to 15 percent slopes, in the town of Carmel, in Putnam County; 230 yards west of Route 6, at Post Office 10541 in the village of Mahopac, 250 feet north of the fence row, in a grassy field:

Ap—0 to 6 inches; dark brown (10YR 3/3) loam; moderate medium and fine granular structure; friable; common fine and few medium roots; about 10 percent rock fragments; moderately acid (limed); clear wavy boundary.

AB—6 to 12 inches; gravelly loam, 70 percent dark brown (10YR 4/3) and 30 percent dark brown (10YR 3/3); weak medium and fine subangular blocky structure; friable; common fine and few medium roots; common fine and medium vesicular pores and few medium tubular pores; about 15 percent rock fragments; slightly acid (limed); clear wavy boundary.

Bw1—12 to 20 inches; yellowish brown (10YR 5/6) gravelly loam; weak medium subangular blocky structure; friable; few fine roots; common fine and medium tubular pores; about 15 percent rock fragments; moderately acid; clear wavy boundary.

Bw2—20 to 29 inches; gravelly loam, 60 percent dark

yellowish brown (10YR 4/4) and 40 percent yellowish brown (10YR 5/4); common fine and medium distinct light brownish gray (10YR 6/2) and many fine faint yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure parting to moderate fine subangular blocky; friable; few fine roots; common fine and medium pores and few large tubular pores; about 15 percent rock fragments; moderately acid; clear wavy boundary.

Cd1—29 to 45 inches; dark grayish brown (2.5Y 4/2) gravelly fine sandy loam; many fine and medium distinct yellowish brown (10YR 5/4) and common medium faint grayish brown (2.5Y 5/2) mottles; massive; firm; common fine tubular pores; about 15 percent rock fragments; moderately acid; clear wavy boundary.

Cd2—45 to 60 inches; gravelly loam, 80 percent olive brown (2.5Y 4/4) and 20 percent dark brown (10YR 4/3); common fine and medium faint grayish brown (2.5Y 5/2) mottles; massive; firm; few medium and common fine tubular pores; about 20 percent rock fragments; moderately acid.

Thickness of the solum ranges from 18 to 38 inches. The depth to bedrock is commonly more than 60 inches. The content of rock fragments ranges, by volume, from 5 to 35 percent in the solum and from 5 to 40 percent in the substratum.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. It is dominantly loam, but the range includes fine sandy loam or sandy loam in the fine-earth fraction. Reaction ranges from very strongly acid to moderately acid in areas that have not been limed. Some pedons do not have an AB horizon.

The upper part of the B horizon has hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 3 to 8. The lower part has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 to 6. It has low-chroma mottles within a depth of 24 inches. The B horizon generally is loam, fine sandy loam, or sandy loam in the fine-earth fraction, but the range includes the gravelly analogs of those textures. Reaction ranges from very strongly acid to moderately acid.

The Cd horizon has hue of 2.5Y or 5Y, value of 4 to 6, and chroma of 1 to 4. It is commonly mottled. It generally is loam, fine sandy loam, sandy loam, or coarse sandy loam in the fine-earth fraction, but the range includes the gravelly analogs of those textures. Reaction ranges from very strongly acid to moderately acid.

Formation of the Soils

The first part of this section describes the factors of soil formation and relates them to the soils in the survey area. The second part defines the processes of horizon development as they relate to soil formation in the area.

Factors of Soil Formation

Soils are natural, three-dimensional bodies at the earth's surface. They formed through the interaction of five major factors: parent material, relief, climate, plant and animal life, and time. The relative influence of each of these factors differs from place to place, and each factor modifies the effect of the others. In places one factor may dominate the formation of a soil and determine most of its properties *(5)*.

Parent Material

Parent material is the unconsolidated earthy material in which soils form. It determines the mineralogical and chemical composition of the soils. It also exerts a strong influence on the rate at which soil-forming processes take place.

The soils in Putnam and Westchester Counties formed in a variety of materials, including glacial till, glaciofluvial (outwash) and glaciolacustrine (lake-laid) deposits, recent alluvium, and organic material. Glacial till, glacial outwash, and lacustrine deposits consist of material that was left when the glaciers melted some 10,000 to 15,000 years ago. Alluvium and organic material are of more recent origin and are being deposited at the present time.

Glacial till is the most extensive parent material in the survey area. Soils that formed in glacial till have a wide range of characteristics. Charlton and Sutton soils have a friable substratum. Paxton and Woodbridge soils have a firm or very firm substratum. Hollis soils formed in a thin deposit of glacial till over hard bedrock.

Soils that formed in glacial outwash generally have loamy textures underlain by stratified sand and gravel. Riverhead and Knickerbocker soils are examples.

In some parts of the survey area, small glacial lakes trapped silty, medium textured sediments. Raynham soils formed in these lacustrine deposits.

Soils on the flood plains formed in water-laid materials, or recent alluvium. These soils are mostly medium textured or moderately coarse textured and show little or no horizon development. Fluvaquents and Udifluvents are examples. Carlisle and Palms soils formed in organic material.

Relief

The shape of the land surface, the slope, and the position of the land surface in relation to the water table have had a great influence on the formation of soils in the survey area. Soils that formed in convex, sloping areas, where runoff is medium or rapid, generally are well drained, have a bright-colored, unmottled subsoil, and are leached to a greater depth than wetter soils in the same general area. In the more gently sloping or concave areas, where runoff is slower, the soils generally exhibit some evidence of short periods of wetness, such as mottling in the subsoil. In level areas or slight depressions, where the water table is at or near the surface for long periods, the soils show evidence of wetness to a marked degree. They have a dark, thick, organic surface layer and a very strongly mottled or grayish subsoil.

Some soils are wet because of a high water table or because they are in a position where water accumulates. The permeability of the soil material and the length, steepness, and configuration of the slope also influence the kind of soil that forms.

Local differences in soils are largely the result of differences in parent material and relief. Table 19 shows the relationship between parent material, landscape position, and drainage class of the soils.

Climate

Climate, particularly the patterns of temperature and precipitation, is an active soil-forming factor. It determines to a large degree the nature of the weathering processes that occur. Also, climate affects the growth of vegetation and the leaching of weathered material. Frost action contributes to the breakdown of stones and boulders. The humid, temperate climate of the region has contributed to an accumulation of

organic matter in the surface layer of some of the soils.

Although the average temperature is slightly higher in lowland areas, particularly near Long Island Sound, the variability of the climate is not great enough to cause major differences among the soils in the survey area. More detailed information about the climate of the survey area is available under the heading "General Nature of the Survey Area."

Plant and Animal Life

All living organisms, including plants, animals, insects, bacteria, and fungi, influence soil formation. Vegetation generally is responsible for the amount of organic matter and nutrients in the soil and for the color and structure of the surface layer. Earthworms and burrowing animals help to keep the soil open and porous. Bacteria and fungi decompose the vegetation, which results in the release of nutrients.

In Putnam and Westchester Counties, the native forests were a major influence on the formation of the soils. The loss of nutrients through leaching is slow under hardwoods because the trees take up large quantities of nutrients and return much of them to the surface each year as leaf litter. Conifers, such as pines or hemlock, do not use large amounts of nutrients; therefore, leaching is more rapid under conifers than it is under hardwoods.

Time

Time is needed for changes to take place in the parent material. In terms of the human lifespan, a long time generally is needed, but the time required for soils to form can be relatively short in geologic terms. The soils of Putnam and Westchester Counties have formed during the period since glaciation. Not all of the soils have reached the same stage of development, however, because of the influences of the other soil-forming factors. Soils that formed on the flood plains, such as Fluvaquents, may receive new sediments with each flooding. These soils have weak soil structure and show little difference in color between horizons. Soils that have well developed horizons, such as Paxton soils, have been forming for longer periods than the Fluvaquents.

Processes of Soil Formation

The soil-forming processes result in the development of distinct layers, or soil horizons. These horizons can be viewed in a vertical cut of soil, referred to as a soil profile. The soil profile extends from the surface downward into material that is little altered by the soil-forming processes. Most soils contain three major horizons, called A, B, and C horizons. The major horizons may be subdivided to indicate changes within a given horizon.

Several processes are involved in the formation of soil horizons. These processes include the accumulation of organic matter, the leaching of soluble salts and minerals, the translocation of clay minerals, the reduction and transfer of iron, and the formation of dense, compact layers in the subsoil *(7)*.

The accumulation of organic matter takes place as plant residue decomposes. This process darkens the surface layer and helps to form an A horizon. It takes a long time to replace this organic matter once it has been lost. The organic matter content of the surface layer of the soils in the survey area averages about 4 percent.

For soils to develop a distinct subsoil, some of the lime and other soluble salts must be leached before other soil processes, such as the translocation of clay minerals, can take place. Factors that affect leaching include the kinds of salts originally present, the rate and depth of percolation, and the texture of the soil.

One of the more important processes of horizon development in some of the soils is the translocation of silicate clay minerals. The amount of clay minerals in a soil is inherent in the nature of the parent material, but the content of clay varies from one soil horizon to another. Clay particles are transported (eluviated) downward from the A horizon and redeposited (illuviated) in the B horizon as clay films on the faces of peds, as linings along pores and root channels, and as coatings on some coarse fragments. In some soils an E horizon has formed below the A horizon as a result of considerable eluviation of clay minerals to the B horizon. Unadilla soils are examples of soils in which the content of clay is higher in the B horizon than in the A horizon because of translocation.

The reduction and transfer of iron compounds occur mainly in the wetter, more poorly drained soils. This process is known as gleying. In poorly drained and very poorly drained soils, such as Sun soils, the grayish color of the subsoil indicates that the reduction of iron has taken place. In moderately well drained and somewhat poorly drained soils, such as Pompton soils, yellowish brown and reddish brown mottles indicate the segregation of iron compounds. The presence of a bright-colored, unmottled subsoil indicates that the soils are well drained and that no reduction or transfer of iron has taken place. Charlton soils, for example, are well drained and do not have mottles in the subsoil.

References

(1) American Association of State Highway and Transportation Officials. 1986. Standard specifications for highway materials and methods of sampling and testing. Ed. 14, 2 vols.

(2) American Society for Testing and Materials. 1993. Standard classification of soils for engineering purposes. ASTM Stand. D 2487.

(3) Broughton, John G., and others. 1962. The geology of New York State. New York St. Mus. and Sci. Serv. Map and Chart Ser. 5.

(4) Flint, Richard F. 1963. Glacial and Pleistocene geology. Ed. 3.

(5) Jenny, Hans. 1941. Factors of soil formation.

(6) Schuberth, Christopher J. 1968. The geology of New York City and environs. New York St. Mus. and Sci. Serv.

(7) Simonson, Roy W. 1959. Outline of a generalized theory of soil genesis. Soil Sci. Soc. Am. Proc. 23: 152-156.

(8) United States Department of Agriculture. 1922. Soil survey of the White Plains Area, New York.

(9) United States Department of Agriculture. 1972. Landscape for living. Yearb. of Agric.

(10) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436.

(11) United States Department of Agriculture. 1982. Forest statistics for New York, 1980. Forest Serv. Resour. Bull. NE-71.

(12) United States Department of Agriculture. 1993. Soil survey manual. U.S. Dep. Agric. Handb. 18.

Glossary

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 40-inch profile or to a limiting layer is expressed as:

Very low	0 to 2.4
Low	2.4 to 3.2
Moderate	3.2 to 5.2
High	more than 5.2

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on the contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long

enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, for example, fire, that exposes the surface.

Esker (geology). A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Excess salt (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Excess sulfur (in tables). Excessive amount of sulfur in the soil. The sulfur causes extreme acidity if the soil is drained, and the growth of most plants is restricted.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, or clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway,

typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. Some soils are assigned to two hydrologic groups.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Kame (geology). An irregular, short ridge or hill of stratified glacial drift.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Liquid limit. The moisture content at which the soil

passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size

of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 drawbar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Salty water (in tables). Water that is too salty for consumption by livestock.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in

millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the substratum. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Varve. A sedimentary layer of a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Tables

TABLE 1.--TEMPERATURE

(Recorded at Carmel, New York, in Putnam County, at an elevation of 490 feet and at Scarsdale, New York, in Westchester County, at an elevation of 280 feet)

Month	Mean monthly temperature		Mean daily maximum temperature		Mean daily minimum temperature	
	Carmel	Scarsdale	Carmel	Scarsdale	Carmel	Scarsdale
	°F	°F	°F	°F	°F	°F
January	25	30	34	38	16	21
February	26	32	35	40	16	23
March	35	39	45	49	25	29
April	47	50	57	61	36	39
May	58	61	70	73	46	48
June	67	69	70	82	55	57
July	71	74	83	86	60	62
August	69	73	81	84	58	61
September	63	66	74	77	52	54
October	52	55	63	67	41	44
November	41	44	50	54	32	35
December	29	33	37	42	21	25
Annual	49	52	59	63	38	41

TABLE 2.--PRECIPITATION

(Recorded at Carmel, New York, in Putnam County, at an elevation of 490 feet and at Scarsdale, New York, in Westchester County, at an elevation of 280 feet)

Month	Total precipitation*		Snowfall	
	Carmel	Scarsdale	Carmel	Scarsdale
	In	In	In	In
January-----	2.8	3.4	10	9
February----	2.8	3.1	12	9
March-------	3.6	4.2	9	7
April-------	3.6	4.1	1	2
May---------	4.1	4.1	**	0
June--------	3.4	3.4	0	0
July--------	4.5	4.6	0	0
August------	4.2	4.7	0	0
September---	3.5	4.0	0	0
October-----	3.4	3.7	**	0
November----	4.3	4.4	2	2
December----	3.9	3.8	10	8
Annual----	44.1	47.5	44	37

* The total includes rain and melted snow.
** Trace.

TABLE 3.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Putnam County	Westchester County	Total-- Area	Total-- Extent
		Acres	Acres	Acres	Pct
Ce	Carlisle muck	2,650	3,194	5,844	1.3
ChB	Charlton loam, 2 to 8 percent slopes	4,301	8,550	12,851	2.8
ChC	Charlton loam, 8 to 15 percent slopes	3,575	7,872	11,447	2.5
ChD	Charlton loam, 15 to 25 percent slopes	1,718	4,051	5,769	1.2
ChE	Charlton loam, 25 to 35 percent slopes	1,299	2,203	3,502	0.8
ClB	Charlton loam, 2 to 8 percent slopes, very stony	1,604	740	2,344	0.5
ClC	Charlton loam, 8 to 15 percent slopes, very stony	2,675	1,164	3,839	0.8
ClD	Charlton loam, 15 to 25 percent slopes, very stony	2,507	951	3,458	0.7
ClE	Charlton loam, 25 to 35 percent slopes, very stony	914	354	1,268	0.3
ClF	Charlton loam, 35 to 45 percent slopes, very stony	744	850	1,594	0.3
CrC	Charlton-Chatfield complex, rolling, very rocky	25,745	44,503	70,248	15.0
CsD	Chatfield-Charlton complex, hilly, very rocky	17,942	25,883	43,825	9.4
CtC	Chatfield-Hollis-Rock outcrop complex, rolling	11,152	9,987	21,139	4.5
CuD	Chatfield-Hollis-Rock outcrop complex, hilly	14,345	11,365	25,710	5.5
Ff	Fluvaquents-Udifluvents complex, frequently flooded	3,352	4,362	7,714	1.7
Fr	Fredon silt loam	320	560	880	0.2
HnB	Hinckley gravelly loamy sand, 3 to 8 percent slopes	135	719	854	0.2
HnC	Hinckley gravelly loamy sand, 8 to 15 percent slopes	132	270	402	0.1
HnD	Hinckley gravelly loamy sand, 15 to 25 percent slopes	48	350	398	0.1
HrF	Hollis-Rock outcrop complex, very steep	9,504	6,628	16,132	3.5
Ip	Ipswich mucky peat	292	206	498	0.1
KnB	Knickerbocker fine sandy loam, 2 to 8 percent slopes	147	895	1,042	0.2
KnC	Knickerbocker fine sandy loam, 8 to 15 percent slopes	44	362	406	0.1
LcA	Leicester loam, 0 to 3 percent slopes, stony	300	1,395	1,695	0.4
LcB	Leicester loam, 3 to 8 percent slopes, stony	1,124	3,702	4,826	1.0
LeB	Leicester loam, 2 to 8 percent slopes, very stony	2,073	1,872	3,945	0.8
Pa	Palms muck	2,202	2,115	4,317	0.9
Pc	Palms and Carlisle soils, ponded	332	459	791	0.2
PnB	Paxton fine sandy loam, 2 to 8 percent slopes	5,800	15,415	21,215	4.6
PnC	Paxton fine sandy loam, 8 to 15 percent slopes	6,799	14,555	21,354	4.6
PnD	Paxton fine sandy loam, 15 to 25 percent slopes	3,039	5,212	8,251	1.8
PoB	Paxton fine sandy loam, 2 to 8 percent slopes, very stony	284	221	505	0.1
PoC	Paxton fine sandy loam, 8 to 15 percent slopes, very stony	902	878	1,780	0.4
PoD	Paxton fine sandy loam, 15 to 25 percent slopes, very stony	905	927	1,832	0.4
Pt	Pits, gravel	134	540	674	0.1
Pv	Pits, quarry	62	230	292	0.1
Pw	Pompton silt loam, loamy substratum	234	692	926	0.2
Ra	Raynham silt loam	275	452	727	0.2
RdA	Ridgebury loam, 0 to 3 percent slopes	469	1,735	2,204	0.5
RdB	Ridgebury loam, 3 to 8 percent slopes	1,687	3,419	5,106	1.1
RgB	Ridgebury loam, 2 to 8 percent slopes, very stony	1,113	995	2,108	0.5
RhA	Riverhead loam, 0 to 3 percent slopes	178	356	534	0.1
RhB	Riverhead loam, 3 to 8 percent slopes	800	2,140	2,940	0.6
RhC	Riverhead loam, 8 to 15 percent slopes	197	770	967	0.2
RhD	Riverhead loam, 15 to 25 percent slopes	105	652	757	0.2
RhE	Riverhead loam, 25 to 50 percent slopes	252	939	1,191	0.3
SbB	Stockbridge silt loam, 2 to 8 percent slopes	540	0	540	0.1
SbC	Stockbridge silt loam, 8 to 15 percent slopes	419	0	419	0.1
SbD	Stockbridge silt loam, 15 to 25 percent slopes	195	0	195	*
SgC	Stockbridge-Rock outcrop complex, rolling	333	0	333	0.1
Sh	Sun loam	1,820	3,442	5,262	1.1
Sm	Sun loam, extremely stony	1,070	1,026	2,096	0.5
SuA	Sutton loam, 0 to 3 percent slopes	208	477	685	0.1
SuB	Sutton loam, 3 to 8 percent slopes	1,297	3,861	5,158	1.1
Ub	Udorthents, smoothed	1,808	7,170	8,978	1.9
Uc	Udorthents, wet substratum	655	3,977	4,632	1.0
UdB	Unadilla silt loam, 2 to 6 percent slopes	58	110	168	*
Uf	Urban land	312	11,881	12,193	2.6
UhB	Urban land-Charlton complex, 2 to 8 percent slopes	238	2,986	3,224	0.7
UhC	Urban land-Charlton complex, 8 to 15 percent slopes	105	1,620	1,725	0.4
UhD	Urban land-Charlton complex, 15 to 25 percent slopes	0	654	654	0.1
UlC	Urban land-Charlton-Chatfield complex, rolling, very rocky	200	11,320	11,520	2.5

See footnote at end of table.

TABLE 3.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Putnam County	Westchester County	Total-- Area	Total-- Extent
		Acres	Acres	Acres	Pct
UlD	Urban land-Charlton-Chatfield complex, hilly, very rocky	10	2,384	2,394	0.5
UmC	Urban land-Chatfield-Rock outcrop complex, rolling	0	899	899	0.2
UpB	Urban land-Paxton complex, 2 to 8 percent slopes	393	7,987	8,380	1.8
UpC	Urban land-Paxton complex, 8 to 15 percent slopes	374	3,293	3,667	0.8
UpD	Urban land-Paxton complex, 15 to 25 percent slopes	50	768	818	0.2
UrB	Urban land-Ridgebury complex, 1 to 8 percent slopes	63	435	498	0.1
UvB	Urban land-Riverhead complex, 2 to 8 percent slopes	15	1,085	1,100	0.2
UvC	Urban land-Riverhead complex, 8 to 15 percent slopes	3	334	337	0.1
UwB	Urban land-Woodbridge complex, 2 to 8 percent slopes	194	3,138	3,332	0.7
WdA	Woodbridge loam, 0 to 3 percent slopes	270	1,102	1,372	0.3
WdB	Woodbridge loam, 3 to 8 percent slopes	3,024	8,292	11,316	2.4
WdC	Woodbridge loam, 8 to 15 percent slopes	799	1,632	2,431	0.5
	Water areas less than 40 acres in size	1,336	2,237	3,573	0.8
	Water areas more than 40 acres in size	7,400	30,200	37,600	8.0
	Total	157,600	308,000	465,600	100.0

* Less than 0.1 percent.

TABLE 4.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
ChB	Charlton loam, 2 to 8 percent slopes
Fr	Fredon silt loam (where drained)
KnB	Knickerbocker fine sandy loam, 2 to 8 percent slopes
LcA	Leicester loam, 0 to 3 percent slopes, stony (where drained)
LcB	Leicester loam, 3 to 8 percent slopes, stony (where drained)
PnB	Paxton fine sandy loam, 2 to 8 percent slopes
Pw	Pompton silt loam, loamy substratum
Ra	Raynham silt loam (where drained)
RhA	Riverhead loam, 0 to 3 percent slopes
RhB	Riverhead loam, 3 to 8 percent slopes
SbB	Stockbridge silt loam, 2 to 8 percent slopes
SuA	Sutton loam, 0 to 3 percent slopes
SuB	Sutton loam, 3 to 8 percent slopes
UdB	Unadilla silt loam, 2 to 6 percent slopes
WdA	Woodbridge loam, 0 to 3 percent slopes
WdB	Woodbridge loam, 3 to 8 percent slopes

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Sweet corn	Alfalfa hay	Grass-legume hay	Grass hay	Pasture
		Tons	Tons	Tons	Tons	AUM*
Ce: Carlisle	Vw	---	---	---	---	---
ChB: Charlton	IIe	5.9	5.0	4.5	4.0	7.5
ChC: Charlton	IIIe	5.3	5.0	4.0	3.5	6.5
ChD: Charlton	IVe	---	4.5	3.5	3.0	5.5
ChE: Charlton	VIe	---	---	---	---	4.0
ClB, ClC, ClD: Charlton	VIs	---	---	---	---	3.5
ClE, ClF: Charlton	VIIs	---	---	---	---	---
CrC**: Charlton-Chatfield	VIs	---	---	---	---	6.0
CsD**: Chatfield-Charlton	VIIs	---	---	---	---	---
CtC**: Chatfield-Hollis-Rock outcrop	VIs	---	---	---	---	5.0
CuD**: Chatfield-Hollis-Rock outcrop	VIIs	---	---	---	---	---
Ff: Fluvaquents-Udifluvents	Vw	---	---	---	---	4.0
Fr: Fredon	IIIw	---	---	3.0	3.0	6.0
HnB: Hinckley	IIIs	4.5	2.5	2.0	2.0	3.5
HnC: Hinckley	IVs	---	---	---	---	2.5
HnD: Hinckley	VIs	---	---	---	---	2.0
HrF**: Hollis-Rock outcrop	VIIs	---	---	---	---	---
Ip: Ipswich	VIIIw	---	---	---	---	---

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Sweet corn	Alfalfa hay	Grass-legume hay	Grass hay	Pasture
		Tons	Tons	Tons	Tons	AUM*
KnB: Knickerbocker	IIIs	4.5	4.0	3.0	4.0	7.5
KnC: Knickerbocker	IIIe	---	4.0	3.0	4.0	7.5
LcA, LcB: Leicester	IIIw	4.5	---	3.5	4.0	6.5
LeB: Leicester	VIIs	---	---	---	---	---
Pa: Palms	Vw	---	---	---	---	---
Pc: Palms and Carlisle	VIIIw	---	---	---	---	---
PnB: Paxton	IIe	5.9	4.5	4.0	4.0	7.5
PnC: Paxton	IIIe	5.2	4.5	4.0	4.0	7.5
PnD: Paxton	IVe	---	4.0	3.5	3.5	6.5
PoB, PoC, PoD: Paxton	VIs	---	---	---	---	4.0
Pt**, Pv**. Pits						
Pw: Pompton	IIw	6.0	5.0	3.5	4.5	8.0
Ra: Raynham	IVw	---	---	---	---	6.0
RdA, RdB: Ridgebury	IIIw	4.5	4.0	3.5	4.0	7.5
RgB: Ridgebury	VIIs	---	---	---	---	---
RhA, RhB: Riverhead	IIs	4.5	4.0	3.0	3.0	5.5
RhC: Riverhead	IIIe	---	---	3.0	3.0	5.5
RhD: Riverhead	IVe	---	---	2.5	2.5	5.0
RhE: Riverhead	VIe	---	---	---	---	3.0
SbB: Stockbridge	IIe	5.9	5.0	4.5	4.5	8.5

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Sweet corn	Alfalfa hay	Grass-legume hay	Grass hay	Pasture
		Tons	Tons	Tons	Tons	AUM*
SbC------------------------ Stockbridge	IIIe	5.3	5.0	4.5	4.5	8.0
SbD------------------------ Stockbridge	IVe	---	4.5	4.0	4.0	7.0
SgC**---------------------- Stockbridge-Rock outcrop	VIs	---	4.0	4.0	4.0	6.0
Sh------------------------- Sun	IVw	---	---	---	---	5.5
Sm------------------------- Sun	VIIs	---	---	---	---	---
SuA------------------------ Sutton	IIw	5.6	4.0	4.0	4.0	7.5
SuB------------------------ Sutton	IIe	5.6	4.0	4.0	4.0	7.5
Ub**, Uc**. Udorthents						
UdB------------------------ Unadilla	IIe	6.0	6.0	4.0	4.5	8.5
Uf**. Urban land						
UhB, UhC, UhD. Urban land-Charlton						
UlC, UlD. Urban land-Charlton-Chatfield						
UmC**. Urban land-Chatfield-Rock outcrop						
UpB, UpC, UpD. Urban land-Paxton						
UrB. Urban land-Ridgebury						
UvB, UvC. Urban land-Riverhead						
UwB. Urban land-Woodbridge						
WdA------------------------ Woodbridge	IIw	5.6	4.0	4.0	4.0	8.0
WdB------------------------ Woodbridge	IIe	5.6	4.0	4.0	4.0	8.0

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Sweet corn	Alfalfa hay	Grass-legume hay	Grass hay	Pasture
		Tons	Tons	Tons	Tons	AUM*
WdC------------------------ Woodbridge	IIIe	5.0	4.0	4.0	4.0	7.5

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

(Miscellaneous areas are excluded. Absence of an entry indicates no acreage)

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	---	---	---	---
II	57,705	51,248	2,983	3,474
III	53,631	37,024	14,711	1,896
IV	21,363	14,972	5,989	402
V	17,875	---	17,875	---
VI	110,569	4,693	---	105,876
VII	96,678	---	---	96,678
VIII	1,289	---	1,289	---

TABLE 7.--SOIL SUITABILITY FOR ORNAMENTAL TREES, SHRUBS, AND GROUND COVER

(Absence of an entry indicates that the soil was not rated or is not suited)

Map symbol	Deciduous trees	Evergreen trees	Deciduous shrubs and ground cover	Evergreen shrubs and ground cover
Ce, Pa, Pc	Red maple, sourgum, alder, American hornbeam, tulip tree, American beech, shadbush.	Eastern arborvitae	Highbush blueberry, chokeberry, winterberry, spicebush, groundsel, swamp azalea, sweet pepperbush, fern.	Rosebay rhododendron, galax, shortia.
ChB, ChC, ChD, ChE, ClB, ClC, ClD, ClE, ClF, CrC, CsD, PnB, PnC, PnD, PoB, PoC, PoD, SbB, SbC, SbD, SgC, UdB	European beech, flowering crabapple, ginkgo, littleleaf linden, pin oak, white ash, Japanese pagodatree, Bradford pear, goldenrain tree, yellowwood, zelkova, falselarch, sawtooth oak, Crimean linden, honeylocust, sourwood, Kousa dogwood, tulip tree, European hornbeam, amur corktree, scarlet oak, Chinese elm, northern red oak, American beech, black birch, flowering dogwood, shadbush, sweetgum, American hornbeam.	Atlas cedar, white fir, eastern hemlock, white pine, oriental spruce, Douglas-fir, Nordmann fir, Himalayan pine, Swiss stone pine, American holly.	Redosier dogwood, forsythia, franklinia, amur honeysuckle, winterberry, fringetree, chokeberry, abelia, cornelian cherry, dogwood, viburnum, Washington hawthorn, witchhazel, fothergilla, deciduous azalea, winged euonymus, highbush blueberry, cotoneaster, hosta, barrenwort.	Inkberry, azalea, Japanese holly, skimmia, mountain laurel, mugho pine, rhododendron, yew, English holly, Japanese andromeda, leucothoe, evergreen euonymus, pachysandra, English ivy, juniper, periwinkle.
Pw, SuA, SuB, WdA, WdB, WdC	Flowering crabapple, ginkgo, littleleaf linden, pin oak, Japanese pagodatree, tulip tree, Bradford pear, goldenrain tree, yellowwood, white ash, zelkova, falselarch, sawtooth oak, phellodendron, Crimean linden, European honeylocust, sourwood, hornbeam, Chinese elm, northern red oak, black birch, American beech, scarlet oak, flowering dogwood, American hornbeam, shadbush, sweetgum.	Atlas cedar, white fir, eastern hemlock, white pine, oriental spruce, Douglas-fir, Nordmann fir, Himalayan pine, Swiss stone pine, American holly.	Washington hawthorn, redosier dogwood, forsythia, franklinia, amur honeysuckle, winterberry, fringetree, chokeberry, abelia, cornelian cherry, viburnum, fothergilla, deciduous azalea, winged euonymus, witchhazel, highbush blueberry, cotoneaster, hosta, barrenwort.	Skimmia, azalea, Japanese holly, mountain laurel, mugho pine, rhododendron, yew, English holly, Japanese andromeda, leucothoe, inkberry, evergreen euonymus, pachysandra, English ivy, juniper, periwinkle.

TABLE 7.--SOIL SUITABILITY FOR ORNAMENTAL TREES, SHRUBS, AND GROUND COVER--Continued

Map symbol	Deciduous trees	Evergreen trees	Deciduous shrubs and ground cover	Evergreen shrubs and ground cover
CtC, HrF, HnB, HnC, HnD, KnB, KnC	Honeylocust, goldenrain tree, hawthorn, amur maple, tallhedge buckthorn, white poplar, northern red oak, Turkish filbert, American beech, black locust, chestnut oak, white ash, crabapple, red maple, black birch.	Black pine, lacebark pine, eastern white pine, red pine, eastern redcedar, American holly.	Sumac, Arnot bristly locust, rugosa rose, redstem dogwood, forsythia, diervilla, Japanese honeysuckle, Japanese barberry, Scotch broom, fiveleaf aralia, Regel's amur or California privet, autumn-olive, dwarf flowering quince, cotoneaster, Anthony Waterer spiraea, fragrant sumac, sweet pepperbush, highbush blueberry, witchhazel, bayberry, Virginia creeper, pinxterbloom.	Mountain laurel, juniper, bearberry.
UhB, UhC, UhD, UlC, UlD, UmC, UpB, UpC, UpD, UvB, UvC	Cornelian cherry, hedge maple, sycamore maple, tree of heaven, hackberry, green ash, ginkgo, honeylocust, Kentucky coffeetree, goldenrain tree, Bradford pear, pin oak, willow oak, English oak, Japanese pagodatree, zelkova, amur maple, Kousa dogwood, sourwood, Japanese snowbell, Carolina silverbell, American hornbeam.	Eastern redcedar	Washington hawthorn, fringetree, Lavalle hawthorn, Japanese tree lilac, cockspur thorn	---
Ff, Fr, LcA, LcB, LeB, Ra, RdA, RdB, RgB, Sh, Sm	Pin oak, willow oak, sweetgum, tulip tree, English oak, shadbush, sourgum, red maple.	Eastern arborvitae	Winged euonymus, redosier dogwood, winterberry, fringetree, chokeberry, lowbush blueberry, sweet pepperbush, swamp azalea, highbush blueberry, buttonbush, fern, yellow root, hosta.	Inkberry, rosebay rhododendron, Christmas fern, bugleweed, lilyturf.

TABLE 7.--SOIL SUITABILITY FOR ORNAMENTAL TREES, SHRUBS, AND GROUND COVER--Continued

Map symbol	Deciduous trees	Evergreen trees	Deciduous shrubs and ground cover	Evergreen shrubs and ground cover
UrB	Shadbush, honeylocust, sycamore maple, willow oak.	Japanese black pine, eastern redcedar.	Cotoneaster, autumn-olive	Japanese yew, shore juniper, mugho pine.
UwB	American hornbeam, hedge maple, amur maple, goldenrain tree, Bradford pear, willow oak, ginkgo, honeylocust, shingle oak, pin oak, zelkova, northern red oak.	Japanese black pine, eastern redcedar.	Lavalle hawthorn, Washington hawthorn, cockspur thorn.	---

TABLE 8.--SOIL SUITABILITY FOR FLOWERS, VEGETABLES, AND FRUIT

(See text for definitions of the ratings. Absence of an entry indicates that the soil is not suited or that the crop is not commonly grown. See text for examples of flowers, fruits, and vegetables)

Soil name and map symbol	Land capability	Perennial flowers	Annual flowers and vegetables	Tree fruit and small fruit
Ce: Carlisle	Vw	Very poor	Very poor	Very poor.
ChB: Charlton	IIe	Good	Good	Good.
ChC: Charlton	IIIe	Fair	Fair	Good.
ChD: Charlton	IVe	Fair	Fair	Good.
ChE: Charlton	VIe	Poor	Poor	Poor.
ClB, ClC, ClD: Charlton	VIs	Poor	Poor	Poor.
ClE: Charlton	VIIs	Very poor	Very poor	Poor.
ClF: Charlton	VIIs	Very poor	Very poor	Very poor.
CrC: Charlton-Chatfield	VIs	Fair	Fair	Fair.
CsD: Chatfield-Charlton	VIIs	Very poor	Very poor	Very poor.
CtC: Chatfield-Hollis-Rock outcrop	VIs	Poor	Poor	Poor.
CuD: Chatfield-Hollis-Rock outcrop	VIIs	Very poor	Very poor	Very poor.
Ff: Fluvaquents-Udifluvents	Vw	Very poor	Very poor	Very poor.
Fr: Fredon	IIIw	Poor	Fair	Very poor.
HnB: Hinckley	IIIs	Fair	Fair	Fair.
HnC: Hinckley	IVs	Poor	Poor	Fair.
HnD: Hinckley	VIs	Poor	Poor	Poor.
HrF: Hollis-Rock outcrop	VIIs	Very poor	Very poor	Very poor.
Ip: Ipswich	VIIIw	---	---	---

TABLE 8.--SOIL SUITABILITY FOR FLOWERS, VEGETABLES, AND FRUIT--Continued

Soil name and map symbol	Land capability	Perennial flowers	Annual flowers and vegetables	Tree fruit and small fruit
KnB: Knickerbocker	IIIs	Good	Good	Good.
KnC: Knickerbocker	IIIe	Fair	Fair	Good.
LcA: Leicester	IIIw	Poor	Fair	Very poor.
LcB: Leicester	IIIw	Poor	Fair	Very poor.
LeB: Leicester	VIIs	Very poor	Very poor	Very poor.
Pa: Palms	Vw	Very poor	Very poor	Very poor.
Pc: Palms and Carlisle	VIIIw	---	---	---
PnB: Paxton	IIe	Good	Good	Good.
PnC: Paxton	IIIe	Fair	Fair	Good.
PnD: Paxton	IVe	Fair	Fair	Good.
PoB, PoC, PoD: Paxton	VIs	Poor	Poor	Poor.
Pt, Pv. Pits				
Pw: Pompton	IIw	Fair	Fair	Poor.
Ra: Raynham	IVw	Poor	Fair	Very poor.
RdA, RdB: Ridgebury	IIIw	Poor	Fair	Very poor.
RgB: Ridgebury	VIIs	Very poor	Very poor	Very poor.
RhA, RhB: Riverhead	IIs	Good	Good	Very good.
RhC: Riverhead	IIIe	Fair	Fair	Good.
RhD: Riverhead	IVe	Poor	Poor	Fair.
RhE: Riverhead	VIs	Very poor	Very poor	Poor.
SbB: Stockbridge	IIe	Good	Good	Good.
SbC: Stockbridge	IIIe	Fair	Fair	Good.

TABLE 8.--SOIL SUITABILITY FOR FLOWERS, VEGETABLES, AND FRUIT--Continued

Soil name and map symbol	Land capability	Perennial flowers	Annual flowers and vegetables	Tree fruit and small fruit
SbD: Stockbridge	IVe	Fair	Fair	Fair.
SgC: Stockbridge-Rock outcrop	VIs	Fair	Fair	Fair.
Sh: Sun	IVw	Poor	Poor	Very poor.
Sm: Sun	VIIs	Very poor	Very poor	Very poor.
SuA: Sutton	IIw	Fair	Good	Fair.
SuB: Sutton	IIe	Fair	Good	Fair.
Ub, Uc. Udorthents				
UdB: Unadilla	IIe	Good	Good	Good.
Uf. Urban land				
UhB, UhC: Urban land-Charlton	---	Fair	Fair	Good.
UhD: Urban land-Charlton	---	Poor	Poor	Fair.
UlC: Urban land-Charlton-Chatfield	---	Fair	Fair	Fair.
UlD: Urban land-Charlton-Chatfield	---	Poor	Poor	Fair.
UmC: Urban land-Chatfield-Rock outcrop	---	Poor	Poor	Poor.
UpB: Urban land-Paxton	---	Good	Good	Good.
UpC, UpD: Urban land-Paxton	---	Fair	Fair	Good.
UrB: Urban land-Ridgebury	---	Poor	Fair	Very poor.
UvB: Urban land-Riverhead	---	Good	Good	Very good.
UvC: Urban land-Riverhead	---	Fair	Fair	Good.

TABLE 8.--SOIL SUITABILITY FOR FLOWERS, VEGETABLES, AND FRUIT--Continued

Soil name and map symbol	Land capability	Perennial flowers	Annual flowers and vegetables	Tree fruit and small fruit
UwB: Urban land-Woodbridge	---	Fair	Good	Fair.
WdA: Woodbridge	IIw	Fair	Good	Fair.
WdB: Woodbridge	IIe	Fair	Good	Fair.
WdC: Woodbridge	IIIe	Fair	Fair	Fair.

TABLE 9.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
Ce------------- Carlisle	2W	Slight	Severe	Severe	Severe	Red maple-----------	56	2	---
						White ash-----------	---	---	
						Green ash-----------	---	---	
						Quaking aspen-------	---	---	
						Swamp white oak-----	---	---	
						Silver maple--------	82	2	
ChB, ChC-------- Charlton	3A	Slight	Slight	Slight	Slight	Northern red oak----	65	3	Eastern white pine, red pine, eastern hemlock, European larch.
						Eastern white pine--	65	8	
						Red maple-----------	55	2	
						Shagbark hickory----	---	---	
						Sugar maple---------	55	2	
ChD, ChE-------- Charlton	3R	Moderate	Moderate	Slight	Slight	Northern red oak----	65	3	Eastern white pine, red pine, eastern hemlock, European larch.
						Eastern white pine--	65	8	
						Red maple-----------	55	2	
						Shagbark hickory----	---	---	
						Sugar maple---------	55	2	
ClB, ClC-------- Charlton	3A	Slight	Slight	Slight	Slight	Northern red oak----	65	3	Eastern white pine, red pine, eastern hemlock, European larch.
						Eastern white pine--	65	8	
						Red maple-----------	55	2	
						Shagbark hickory----	---	---	
						Sugar maple---------	55	2	
ClD, ClE-------- Charlton	3R	Moderate	Moderate	Slight	Slight	Northern red oak----	65	3	Eastern white pine, red pine, eastern hemlock, European larch.
						Eastern white pine--	65	8	
						Red pine------------	70	9	
						Red spruce----------	50	8	
						Red maple-----------	55	2	
						Shagbark hickory----	---	---	
						Sugar maple---------	55	2	
ClF------------- Charlton	3R	Severe	Severe	Slight	Slight	Northern red oak----	65	3	***
						Eastern white pine--	65	8	
						Red pine------------	70	9	
						Red spruce----------	50	8	
						Red maple-----------	55	2	
						Shagbark hickory----	---	---	
						Sugar maple---------	55	2	
CrC**:									
Charlton-------	3A	Slight	Slight	Slight	Slight	Northern red oak----	65	3	Eastern white pine, red pine, eastern hemlock, European larch.
						Eastern white pine--	65	8	
						Red pine------------	70	9	
						Red spruce----------	50	8	
						Red maple-----------	55	2	
						Shagbark hickory----	---	---	
						Sugar maple---------	55	2	

See footnotes at end of table.

TABLE 9.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
CrC*:									
Chatfield------	3A	Slight	Slight	Slight	Slight	Sugar maple---------	65	3	Eastern white pine, red pine, European larch.
						Northern red oak----	65	3	
						White ash-----------	75	3	
CsD**:									
Chatfield------	3R	Slight	Moderate	Slight	Slight	Sugar maple---------	65	3	Eastern white pine, red pine, European larch.
						Northern red oak----	65	3	
						White ash-----------	75	3	
Charlton-------	3R	Moderate	Moderate	Slight	Slight	Northern red oak----	65	3	Eastern white pine, red pine, eastern hemlock, European larch.
						Eastern white pine--	65	8	
						Red pine------------	70	9	
						Red spruce----------	50	8	
						Red maple-----------	55	2	
						Shagbark hickory----	---	---	
						Sugar maple---------	55	2	
CtC**:									
Chatfield------	3A	Slight	Slight	Slight	Slight	Sugar maple---------	65	3	Eastern white pine, red pine, European larch.
						Northern red oak----	65	3	
						White ash-----------	75	3	
Hollis---------	2D	Slight	Slight	Moderate	Severe	Northern red oak----	47	2	Eastern white pine.
						Eastern white pine--	55	6	
						Sugar maple---------	56	2	
Rock outcrop.									
CuD**:									
Chatfield------	3R	Slight	Moderate	Slight	Slight	Sugar maple---------	65	3	Eastern white pine, red pine, European larch.
						Northern red oak----	65	3	
						White ash-----------	75	3	
Hollis---------	2D	Moderate	Moderate	Moderate	Severe	Northern red oak----	47	2	Eastern white pine.
						Eastern white pine--	55	6	
						Sugar maple---------	56	2	
Rock outcrop.									
Fr-------------- Fredon	3W	Slight	Severe	Severe	Severe	Northern red oak----	60	3	Yellow-poplar, eastern white pine, white spruce, Norway spruce.
						Yellow-poplar-------	80	5	
						Eastern white pine--	70	9	
						Red maple-----------	70	3	
HnB, HnC-------- Hinckley	7S	Slight	Slight	Severe	Slight	Eastern white pine--	60	7	Eastern white pine, red pine.
						Northern red oak----	49	2	
						Red pine------------	58	7	
						Sugar maple---------	57	2	

See footnotes at end of table.

TABLE 9.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi- nation symbol	Management concerns: Erosion hazard	Management concerns: Equip- ment limita- tion	Management concerns: Seedling mortal- ity	Management concerns: Wind- throw hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Produc- tivity class*	Trees to plant
HnD------------- Hinckley	7S	Moderate	Moderate	Severe	Slight	Eastern white pine-- Northern red oak---- Red pine------------ Sugar maple---------	60 49 58 57	7 2 7 2	Eastern white pine, red pine.
HrF**:									
Hollis---------	2R	Severe	Severe	Moderate	Severe	Northern red oak---- Eastern white pine--	49 60	2 7	***
Rock outcrop.									
KnB, KnC-------- Knickerbocker	4A	Slight	Slight	Slight	Slight	Northern red oak---- Sugar maple---------	75 65	4 3	Eastern white pine, red pine, European larch.
LcA------------- Leicester	3W	Slight	Severe	Moderate	Severe	Red maple----------- Northern red oak---- Eastern white pine--	70 56 69	3 3 9	Eastern white pine, white spruce, eastern hemlock.
LcB, LeB-------- Leicester	3W	Slight	Severe	Moderate	Severe	Red maple----------- Northern red oak---- Eastern white pine--	70 56 69	3 3 9	Eastern white pine, white spruce, eastern hemlock.
Pc**: Palms.									
Carlisle-------	2W	Slight	Severe	Severe	Severe	Red maple----------- White ash----------- Green ash----------- Quaking aspen------- Swamp white oak----- Silver maple--------	56 --- --- --- --- 82	2 --- --- --- --- 2	***
PnB, PnC-------- Paxton	3D	Slight	Slight	Moderate	Slight	Northern red oak---- Red pine------------ Eastern white pine-- Sugar maple---------	65 67 66 75	3 8 8 3	Red pine, eastern white pine, Norway spruce, European larch.
PnD------------- Paxton	3R	Moderate	Moderate	Moderate	Slight	Northern red oak---- Red pine------------ Eastern white pine-- Sugar maple---------	65 67 66 75	3 8 8 3	Red pine, eastern white pine, Norway spruce, European larch.
PoB, PoC-------- Paxton	3D	Slight	Slight	Slight	Moderate	Northern red oak---- Eastern white pine-- Red pine------------ Sugar maple---------	65 66 67 75	3 8 8 3	Red pine, Norway spruce, eastern white pine, European larch.

See footnotes at end of table.

TABLE 9.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
PoD------------- Paxton	3R	Moderate	Moderate	Slight	Moderate	Northern red oak---- Eastern white pine-- Red pine------------ Sugar maple---------	65 66 67 75	3 8 8 3	Red pine, Norway spruce, eastern white pine, European larch.
Pw-------------- Pompton	4W	Slight	Moderate	Moderate	Moderate	White oak----------- White ash-----------	75 ---	4 ---	Eastern white pine, European larch.
Ra-------------- Raynham	3W	Slight	Severe	Moderate	Severe	Red maple----------- Eastern white pine-- White spruce-------- Red spruce---------- Elm----------------- Eastern hemlock----- Gray birch---------- Sugar maple--------- Balsam fir---------- Tamarack------------	65 65 55 45 --- --- --- --- --- ---	3 8 9 7 --- --- --- --- --- ---	Eastern white pine, white spruce.
RdA, RdB, RgB--- Ridgebury	3W	Slight	Severe	Severe	Severe	Northern red oak---- Red spruce---------- Eastern white pine-- Sugar maple---------	57 47 63 52	3 7 8 2	Eastern white pine, white spruce.
RhA, RhB, RhC--- Riverhead	3A	Slight	Slight	Slight	Slight	Sugar maple--------- Northern red oak---- Black cherry-------- Eastern white pine--	63 70 70 75	3 4 3 10	Eastern white pine, Norway spruce, red pine, European larch.
RhD------------- Riverhead	3R	Slight	Moderate	Slight	Slight	Sugar maple--------- Northern red oak---- Black cherry-------- Eastern white pine--	63 70 70 75	3 4 3 10	Eastern white pine, Norway spruce, red pine, European larch.
RhE------------- Riverhead	3R	Slight	Severe	Slight	Slight	Sugar maple--------- Northern red oak---- Black cherry-------- Eastern white pine--	63 70 70 75	3 4 3 10	Eastern white pine, Norway spruce, red pine, European larch.
SbB, SbC-------- Stockbridge	4A	Slight	Slight	Slight	Slight	Northern red oak---- Sugar maple--------- Eastern white pine-- American beech------ Eastern hemlock-----	70 60 75 --- ---	4 3 10 --- ---	Eastern white pine, white spruce, Norway spruce, European larch.
SbD------------- Stockbridge	4R	Moderate	Moderate	Slight	Slight	Northern red oak---- Sugar maple--------- Eastern white pine-- American beech------ Eastern hemlock-----	70 60 75 --- ---	4 3 10 --- ---	Eastern white pine, white spruce, Norway spruce, European larch.

See footnotes at end of table.

TABLE 9.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
SgC**:									
Stockbridge----	4A	Slight	Slight	Slight	Slight	Northern red oak----	70	4	Eastern white pine, white spruce, Norway spruce, European larch.
						Sugar maple---------	60	3	
						Eastern white pine--	75	10	
						American beech------	---	---	
						Eastern hemlock-----	---	---	
Rock outcrop.									
Sh-------------- Sun	3W	Slight	Severe	Severe	Severe	Red maple-----------	65	3	***
Sm-------------- Sun	3X	Slight	Severe	Severe	Severe	Red maple-----------	65	3	***
SuA, SuB-------- Sutton	2A	Slight	Slight	Slight	Slight	Sugar maple---------	54	2	Eastern white pine, white spruce, European larch, Norway spruce.
						Northern red oak----	62	3	
						Eastern white pine--	62	8	
						Black cherry--------	72	3	
UdB------------- Unadilla	3A	Slight	Slight	Slight	Slight	Sugar maple---------	70	3	Eastern white pine, black cherry, Norway spruce, European larch, red pine, white spruce.
						Eastern white pine--	85	10	
						Northern red oak----	80	4	
						Black cherry--------	80	4	
						White ash-----------	95	5	
WdA, WdB, WdC--- Woodbridge	4D	Slight	Slight	Slight	Moderate	Northern red oak----	72	4	Eastern white pine, red pine, European larch.
						Eastern white pine--	67	8	
						Red pine------------	65	8	
						Red spruce----------	50	8	
						Sugar maple---------	65	3	

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

*** These soils are not suited to the trees commonly grown in the survey area.

TABLE 10.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ce----- Carlisle	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
ChB----- Charlton	Slight-----	Slight-----	Moderate: slope, small stones.	Slight-----	Slight.
ChC----- Charlton	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: slope.
ChD----- Charlton	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
ChE----- Charlton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
ClB----- Charlton	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Slight-----	Moderate: large stones.
ClC----- Charlton	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Slight-----	Moderate: large stones, slope.
ClD----- Charlton	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: slope.	Severe: slope.
ClE, ClF----- Charlton	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.	Severe: slope.
CrC*:					
Charlton-----	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: slope.
Chatfield-----	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: droughty, slope, thin layer.
CsD*:					
Chatfield-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Charlton-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CtC*:					
Chatfield-----	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: droughty, slope, thin layer.
Hollis-----	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight-----	Severe: depth to rock.

See footnote at end of table.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
CtC*:					
Rock outcrop	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight	Severe: depth to rock.
CuD*:					
Chatfield	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Hollis	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
Rock outcrop	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: depth to rock.
Ff*:					
Fluvaquents	Severe: flooding, ponding.	Severe: ponding.	Severe: small stones, ponding, flooding.	Severe: ponding.	Severe: ponding, droughty, flooding.
Udifluvents	Severe: flooding.	Moderate: flooding, wetness, small stones.	Severe: small stones, flooding.	Moderate: wetness, flooding.	Severe: droughty, flooding.
Fr Fredon	Severe: small stones, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
HnB Hinckley	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Severe: droughty.
HnC Hinckley	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Severe: droughty.
HnD Hinckley	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: droughty, slope.
HrF*:					
Hollis	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.	Severe: thin layer, slope.
Rock outcrop	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: depth to rock.
Ip Ipswich	Severe: ponding, flooding, excess humus.	Severe: ponding, excess humus, excess salt.	Severe: ponding, flooding, excess humus.	Severe: ponding, excess humus.	Severe: excess salt, excess sulfur, ponding.
KnB Knickerbocker	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.

See footnote at end of table.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
KnC: Knickerbocker	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
LcA: Leicester	Severe: wetness.	Severe: wetness.	Severe: small stones, wetness.	Severe: wetness.	Severe: wetness.
LcB: Leicester	Severe: wetness.	Severe: wetness.	Severe: small stones, wetness.	Severe: wetness.	Severe: wetness.
LeB: Leicester	Severe: wetness.	Severe: wetness.	Severe: large stones, wetness.	Severe: wetness.	Severe: wetness.
Pa: Palms	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
Pc*:					
Palms	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
Carlisle	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
PnB: Paxton	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones.	Slight	Slight.
PnC: Paxton	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
PnD: Paxton	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
PoB: Paxton	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Slight	Moderate: large stones.
PoC: Paxton	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Slight	Moderate: large stones, slope.
PoD: Paxton	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: slope.	Severe: slope.
Pt*, Pv*. Pits					
Pw: Pompton	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Ra: Raynham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.

See footnote at end of table.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
RdA, RdB: Ridgebury	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
RgB: Ridgebury	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, large stones, small stones.	Severe: wetness.	Severe: wetness.
RhA: Riverhead	Slight	Slight	Slight	Slight	Slight.
RhB: Riverhead	Slight	Slight	Moderate: slope.	Slight	Slight.
RhC: Riverhead	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
RhD: Riverhead	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
RhE: Riverhead	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
SbB: Stockbridge	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones.	Slight	Slight.
SbC: Stockbridge	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
SbD: Stockbridge	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
SgC*:					
Stockbridge	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
Rock outcrop	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight	Severe: depth to rock.
Sh: Sun	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Sm: Sun	Severe: wetness, large stones.	Severe: wetness, large stones.	Severe: large stones, small stones, wetness.	Severe: wetness.	Severe: wetness.
SuA: Sutton	Moderate: wetness.	Moderate: wetness.	Moderate: small stones.	Moderate: wetness.	Moderate: wetness.
SuB: Sutton	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones.	Moderate: wetness.	Moderate: wetness.

See footnote at end of table.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ub*, Uc*. Udorthents					
UdB: Unadilla	Slight	Slight	Moderate: slope.	Moderate: erodes easily.	Slight.
Uf*: Urban land	Variable	Variable	Variable	Variable	Variable.
UhB*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Charlton	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
UhC*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Charlton	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
UhD*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Charlton	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
UlC*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Charlton	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Chatfield	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope, thin layer.
UlD*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Charlton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Chatfield	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
UmC*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Chatfield	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope, thin layer.
Rock outcrop	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight	Severe: depth to rock.

See footnote at end of table.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
UpB*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Paxton	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones.	Slight	Slight.
UpC*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Paxton	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
UpD*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Paxton	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
UrB*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Ridgebury	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
UvB*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Riverhead	Slight	Slight	Moderate: slope.	Slight	Slight.
UvC*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Riverhead	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
UwB*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Woodbridge	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones.	Moderate: wetness.	Moderate: wetness.
WdA Woodbridge	Moderate: wetness.	Moderate: wetness.	Moderate: small stones.	Moderate: wetness.	Moderate: wetness.
WdB Woodbridge	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones.	Moderate: wetness.	Moderate: wetness.
WdC Woodbridge	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Moderate: wetness.	Moderate: wetness, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
Ce: Carlisle	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
ChB: Charlton	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ChC: Charlton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ChD: Charlton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
ChE: Charlton	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
ClB: Charlton	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
ClC, ClD, ClE, ClF: Charlton	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
CrC*:										
Charlton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Chatfield	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
CsD*:										
Chatfield	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Charlton	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CtC*:										
Chatfield	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
Hollis	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Rock outcrop	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
CuD*:										
Chatfield	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Hollis	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Rock outcrop	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.

See footnote at end of table.

TABLE 11.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
Ff*:										
Fluvaquents	Very poor.	Very poor.	Poor	Poor	Poor	Good	Good	Very poor.	Poor	Good.
Udifluvents	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Fr: Fredon	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
HnB, HnC, HnD: Hinckley	Poor	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
HrF*:										
Hollis	Very poor.	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Rock outcrop	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Ip: Ipswich	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
KnB, KnC: Knickerbocker	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
LcA, LcB. Leicester										
LeB: Leicester	Very poor.	Poor	Fair	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
Pa: Palms	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Pc*:										
Palms	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Carlisle	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
PnB: Paxton	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
PnC: Paxton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
PnD: Paxton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
PoB: Paxton	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
PoC, PoD: Paxton	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Pt*, Pv*. Pits										

See footnote at end of table.

TABLE 11.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
Pw: Pompton	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
Ra: Raynham	Poor	Poor	Fair	Fair	Fair	Good	Fair	Poor	Fair	Fair.
RdA: Ridgebury	Poor	Poor	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
RdB: Ridgebury	Poor	Poor	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
RgB: Ridgebury	Very poor.	Poor	Fair	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
RhA: Riverhead	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
RhB, RhC: Riverhead	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
RhD: Riverhead	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
RhE: Riverhead	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
SbB: Stockbridge	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
SbC: Stockbridge	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
SbD: Stockbridge	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
SgC*:										
Stockbridge	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Rock outcrop	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Sh: Sun	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Sm: Sun	Very poor.	Very poor.	Poor	Poor	Poor	Good	Fair	Very poor.	Poor	Fair.
SuA: Sutton	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
SuB: Sutton	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Ub*, Uc*. Udorthents										

See footnote at end of table.

TABLE 11.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
UdB----------------- Unadilla	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Uf*. Urban land										
UhB*: Urban land.										
Charlton----------	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
UhC*: Urban land.										
Charlton----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
UhD*: Urban land.										
Charlton----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
UlC*: Urban land.										
Charlton----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Chatfield---------	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
UlD*: Urban land.										
Charlton----------	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Chatfield---------	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
UmC*: Urban land.										
Chatfield---------	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
Rock outcrop------	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
UpB*: Urban land.										
Paxton------------	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 11.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
UpC*:										
Urban land.										
Paxton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
UpD*:										
Urban land.										
Paxton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
UrB*:										
Urban land.										
Ridgebury	Poor	Poor	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
UvB*, UvC*:										
Urban land.										
Riverhead	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
UwB*:										
Urban land.										
Woodbridge	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WdA: Woodbridge	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
WdB: Woodbridge	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WdC: Woodbridge	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Ce----------------- Carlisle	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.
ChB--------------- Charlton	Slight---------	Slight---------	Slight---------	Moderate: slope.	Slight---------	Slight.
ChC--------------- Charlton	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
ChD, ChE---------- Charlton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
ClB--------------- Charlton	Slight---------	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: large stones.
ClC--------------- Charlton	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: large stones, slope.
ClD, ClE, ClF----- Charlton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CrC*:						
Charlton---------	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
Chatfield--------	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock, frost action.	Moderate: droughty, slope, thin layer.
CsD*:						
Chatfield--------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope	Severe: slope.
Charlton---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CtC*:						
Chatfield--------	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock, frost action.	Moderate: droughty, slope, thin layer.
Hollis-----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.

See footnote at end of table.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
CtC*:						
Rock outcrop	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.
CuD*:						
Chatfield	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Hollis	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
Rock outcrop	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.
Ff*:						
Fluvaquents	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, flooding, frost action.	Severe: ponding, droughty, flooding.
Udifluvents	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Severe: droughty, flooding.
Fr Fredon	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
HnB Hinckley	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: droughty.
HnC Hinckley	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
HnD Hinckley	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
HrF*:						
Hollis	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.
Rock outcrop	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.
Ip Ipswich	Severe: excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding, low strength.	Severe: low strength, ponding, flooding.	Severe: excess salt, excess sulfur, ponding.
KnB Knickerbocker	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.

See footnote at end of table.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
KnC--------------- Knickerbocker	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
LcA--------------- Leicester	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
LcB, LeB---------- Leicester	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
Pa---------------- Palms	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.
Pc*:						
Palms------------	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.
Carlisle---------	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.
PnB--------------- Paxton	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Slight.
PnC--------------- Paxton	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: slope.
PnD--------------- Paxton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PoB--------------- Paxton	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: large stones.
PoC--------------- Paxton	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: large stones, slope.
PoD--------------- Paxton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pt*, Pv*. Pits						
Pw---------------- Pompton	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: frost action.	Moderate: wetness.

See footnote at end of table.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Ra: Raynham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
RdA, RdB, RgB: Ridgebury	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
RhA: Riverhead	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: frost action.	Slight.
RhB: Riverhead	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.
RhC: Riverhead	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
RhD, RhE: Riverhead	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
SbB: Stockbridge	Slight	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.
SbC: Stockbridge	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
SbD: Stockbridge	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
SgC*:						
Stockbridge	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
Rock outcrop	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.
Sh, Sm: Sun	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
SuA: Sutton	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: frost action.	Moderate: wetness.
SuB: Sutton	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Moderate: wetness.
Ub*, Uc*. Udorthents						
UdB: Unadilla	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Severe: frost action.	Slight.

See footnote at end of table.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Uf*: Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
UhB*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
Charlton	Slight	Slight	Slight	Moderate: slope.	Slight	Slight.
UhC*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
Charlton	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
UhD*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
Charlton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
UlC*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
Charlton	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
Chatfield	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock, frost action.	Moderate: droughty, slope, thin layer.
UlD*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
Charlton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Chatfield	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
UmC*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
Chatfield	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock, frost action.	Moderate: droughty, slope, thin layer.
Rock outcrop	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.
UpB*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
Paxton	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Slight.

See footnote at end of table.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
UpC*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
Paxton	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: slope.
UpD*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
Paxton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
UrB*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
Ridgebury	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
UvB*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
Riverhead	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.
UvC*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
Riverhead	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
UwB*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
Woodbridge	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Moderate: wetness.
WdA Woodbridge	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: frost action.	Moderate: wetness.
WdB Woodbridge	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Moderate: wetness.
WdC Woodbridge	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: frost action.	Moderate: wetness, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ce: Carlisle	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
ChB: Charlton	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
ChC: Charlton	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: small stones, slope.
ChD, ChE: Charlton	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
ClB: Charlton	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
ClC: Charlton	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: small stones, slope.
ClD, ClE, ClF: Charlton	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
CrC*:					
Charlton	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: small stones, slope.
Chatfield	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim.
CsD*:					
Chatfield	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, slope.
Charlton	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
CtC*:					
Chatfield	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim.

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CtC*:					
Hollis-------------	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock.	Poor: depth to rock, thin layer.
Rock outcrop-------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
CuD*:					
Chatfield----------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, slope.
Hollis-------------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope, thin layer.
Rock outcrop-------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, slope.
Ff*:					
Fluvaquents--------	Severe: flooding, ponding, percs slowly.	Severe: seepage, flooding, ponding.	Severe: flooding, depth to rock, seepage.	Severe: flooding, seepage, ponding.	Poor: too sandy, small stones, ponding.
Udifluvents--------	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding.	Severe: flooding, depth to rock, seepage.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, small stones.
Fr------------------ Fredon	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, small stones.
HnB----------------- Hinckley	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
HnC----------------- Hinckley	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
HnD----------------- Hinckley	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, too sandy, slope.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
HrF*:					
Hollis	Severe: slope, depth to rock.	Severe: seepage, slope, depth to rock.	Severe: seepage, slope, depth to rock.	Severe: seepage, slope, depth to rock.	Poor: thin layer, slope, depth to rock.
Rock outcrop	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, slope.
Ip: Ipswich	Severe: flooding, ponding.	Severe: seepage, flooding, excess humus.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: ponding, excess humus, excess salt.
KnB: Knickerbocker	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Severe: seepage, too sandy.
KnC: Knickerbocker	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Severe: seepage, too sandy.
LcA: Leicester	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness.
LcB, LeB: Leicester	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness.
Pa: Palms	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: ponding.	Severe: seepage, ponding.	Poor: ponding.
Pc*:					
Palms	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: ponding.	Severe: seepage, ponding.	Poor: ponding.
Carlisle	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
PnB: Paxton	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
PnC: Paxton	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
PnD: Paxton	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
PoB: Paxton	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
PoC: Paxton	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
PoD: Paxton	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Pt*, Pv*. Pits					
Pw: Pompton	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Poor: wetness, thin layer.
Ra: Raynham	Severe: wetness, percs slowly.	Moderate: seepage.	Severe: wetness.	Severe: wetness.	Poor: wetness.
RdA: Ridgebury	Severe: percs slowly, wetness.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
RdB, RgB: Ridgebury	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
RhA, RhB: Riverhead	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
RhC: Riverhead	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
RhD, RhE: Riverhead	Severe: poor filter, slope.	Severe: slope, seepage.	Severe: slope, seepage, too sandy.	Severe: slope, seepage.	Poor: seepage, too sandy, slope.
SbB: Stockbridge	Severe: percs slowly.	Moderate: slope.	Slight	Slight	Fair: small stones.
SbC: Stockbridge	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: small stones, slope.
SbD: Stockbridge	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
SgC*:					
Stockbridge	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: small stones, slope.

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
SgC*:					
Rock outcrop	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
Sh, Sm Sun	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
SuA, SuB Sutton	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Fair: small stones, wetness.
Ub*, Uc*. Udorthents					
UdB Unadilla	Slight	Severe: seepage.	Severe: seepage.	Slight	Fair: thin layer.
Uf* Urban land	Variable	Variable	Variable	Variable	Variable.
UhB*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Charlton	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
UhC*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Charlton	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: small stones, slope.
UhD*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Charlton	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
UlC*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Charlton	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: small stones, slope.
Chatfield	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim.
UlD*:					
Urban land	Variable	Variable	Variable	Variable	Variable.

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
UlD*:					
Charlton	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Chatfield	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, slope.
UmC*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Chatfield	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim.
Rock outcrop	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
UpB*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Paxton	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
UpC*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Paxton	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
UpD*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Paxton	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
UrB*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Ridgebury	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
UvB*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Riverhead	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
UvC*:					
Urban land	Variable	Variable	Variable	Variable	Variable.

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
UvC*:					
Riverhead	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
UwB*:					
Urban land	Variable	Variable	Variable	Variable	Variable.
Woodbridge	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.
WdA Woodbridge	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.
WdB Woodbridge	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.
WdC Woodbridge	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Ce: Carlisle	Poor: wetness, low strength.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
ChB: Charlton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
ChC: Charlton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
ChD: Charlton	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
ChE: Charlton	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
ClB: Charlton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
ClC: Charlton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
ClD: Charlton	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
ClE, ClF: Charlton	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
CrC*:				
Charlton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
Chatfield	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
CsD*:				
Chatfield	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Charlton	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
CtC*:				
Chatfield	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Hollis	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock.
Rock outcrop	Poor: depth to rock.	---	---	Poor: depth to rock.

See footnote at end of table.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
CuD*:				
Chatfield	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Hollis	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, slope.
Rock outcrop	Poor: depth to rock, slope.	---	---	Poor: depth to rock, slope.
Ff*:				
Fluvaquents	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, small stones, area reclaim.
Udifluvents	Fair: depth to rock, wetness.	Probable	Probable	Poor: too sandy, small stones, area reclaim.
Fr Fredon	Poor: wetness.	Probable	Probable	Poor: small stones, area reclaim, wetness.
HnB, HnC Hinckley	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
HnD Hinckley	Fair: slope.	Probable	Probable	Poor: too sandy, small stones, slope.
HrF*:				
Hollis	Poor: slope, depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, depth to rock.
Rock outcrop	Poor: depth to rock, slope.	---	---	Poor: depth to rock, slope.
Ip Ipswich	Poor: low strength, wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, excess salt, wetness.
KnB Knickerbocker	Good	Probable	Improbable: too sandy.	Fair: thin layer.
KnC Knickerbocker	Good	Probable	Improbable: too sandy.	Fair: slope, thin layer.

See footnote at end of table.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
LcA: Leicester	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
LcB, LeB: Leicester	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Pa: Palms	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
Pc*:				
Palms	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
Carlisle	Poor: wetness, low strength.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
PnB: Paxton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
PnC: Paxton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
PnD: Paxton	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
PoB: Paxton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
PoC: Paxton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
PoD: Paxton	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Pt*, Pv*. Pits				
Pw: Pompton	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Ra: Raynham	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
RdA, RdB, RgB: Ridgebury	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, small stones, area reclaim.
RhA, RhB, RhC: Riverhead	Good	Probable	Probable	Poor: small stones.

See footnote at end of table.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
RhD------------------- Riverhead	Fair: slope.	Probable-------------	Probable-------------	Poor: small stones, slope.
RhE------------------- Riverhead	Poor: slope.	Probable-------------	Probable-------------	Poor: small stones, slope.
SbB------------------- Stockbridge	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
SbC------------------- Stockbridge	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
SbD------------------- Stockbridge	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
SgC*:				
Stockbridge----------	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
Rock outcrop---------	Poor: depth to rock.	---	---	Poor: depth to rock.
Sh, Sm---------------- Sun	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, wetness.
SuA, SuB-------------- Sutton	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Ub*, Uc*. Udorthents				
UdB------------------- Unadilla	Good-----------------	Probable-------------	Probable-------------	Moderate: area reclaim.
Uf*------------------- Urban land	Variable-------------	Variable-------------	Variable-------------	Variable.
UhB*:				
Urban land-----------	Variable-------------	Variable-------------	Variable-------------	Variable.
Charlton-------------	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
UhC*:				
Urban land-----------	Variable-------------	Variable-------------	Variable-------------	Variable.
Charlton-------------	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
UhD*:				
Urban land-----------	Variable-------------	Variable-------------	Variable-------------	Variable.
Charlton-------------	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
UlC*:				
Urban land	Variable	Variable	Variable	Variable.
Charlton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
Chatfield	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
UlD*:				
Urban land	Variable	Variable	Variable	Variable.
Charlton	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Chatfield	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
UmC*:				
Urban land	Variable	Variable	Variable	Variable.
Chatfield	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Rock outcrop	Poor: depth to rock.	---	---	Poor: depth to rock.
UpB*:				
Urban land	Variable	Variable	Variable	Variable.
Paxton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
UpC*:				
Urban land	Variable	Variable	Variable	Variable.
Paxton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
UpD*:				
Urban land	Variable	Variable	Variable	Variable.
Paxton	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
UrB*:				
Urban land	Variable	Variable	Variable	Variable.
Ridgebury	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, small stones, area reclaim.

See footnote at end of table.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
UvB*, UvC*:				
Urban land	Variable	Variable	Variable	Variable.
Riverhead	Good	Probable	Probable	Poor: small stones.
UwB*:				
Urban land	Variable	Variable	Variable	Variable.
Woodbridge	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
WdA, WdB: Woodbridge	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
WdC: Woodbridge	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
Ce: Carlisle	Severe: seepage.	Severe: excess humus, ponding.	Severe: slow refill.	Ponding, subsides, frost action.	Ponding, soil blowing.	Wetness.
ChB: Charlton	Severe: seepage.	Moderate: seepage, piping.	Severe: no water.	Deep to water	Favorable	Favorable.
ChC, ChD, ChE: Charlton	Severe: slope, seepage.	Moderate: seepage, piping.	Severe: no water.	Deep to water	Slope	Slope.
ClB: Charlton	Severe: seepage.	Moderate: seepage, piping.	Severe: no water.	Deep to water	Favorable	Favorable.
ClC, ClD, ClE, ClF: Charlton	Severe: slope, seepage.	Moderate: seepage, piping.	Severe: no water.	Deep to water	Slope	Slope.
CrC*: Charlton	Severe: slope, seepage.	Moderate: seepage, piping.	Severe: no water.	Deep to water	Slope	Slope.
Chatfield	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
CsD*: Chatfield	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
Charlton	Severe: slope, seepage.	Moderate: seepage, piping.	Severe: no water.	Deep to water	Slope	Slope.
CtC*, CuD*: Chatfield	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
Hollis	Severe: depth to rock, slope.	Severe: thin layer, piping.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
Rock outcrop	Severe: depth to rock, slope.	---	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, depth to rock.

See footnote at end of table.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
Ff*:						
Fluvaquents	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: slow refill, cutbanks cave.	Ponding, percs slowly, flooding.	Ponding, too sandy, percs slowly.	Wetness, droughty, percs slowly.
Udifluvents	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Percs slowly, flooding.	Wetness, too sandy, percs slowly.	Droughty, percs slowly.
Fr: Fredon	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Frost action	Wetness, too sandy.	Wetness.
HnB: Hinckley	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Large stones, too sandy.	Large stones, droughty.
HnC, HnD: Hinckley	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, large stones, too sandy.	Large stones, slope, droughty.
HrF*:						
Hollis	Severe: slope, depth to rock.	Severe: thin layer, piping.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
Rock outcrop	Severe: depth to rock, slope.	---	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
Ip: Ipswich	Severe: seepage.	Severe: excess humus, ponding, excess salt.	Severe: salty water.	Ponding, flooding, excess salt.	Ponding	Wetness, excess salt.
KnB: Knickerbocker	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy	Droughty.
KnC: Knickerbocker	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy.	Slope, droughty.
LcA: Leicester	Severe: seepage.	Severe: wetness.	Moderate: slow refill.	Frost action	Wetness	Wetness.
LcB, LeB: Leicester	Severe: seepage.	Severe: wetness.	Moderate: slow refill.	Frost action, slope.	Wetness	Wetness.
Pa: Palms	Severe: seepage.	Severe: piping, ponding.	Severe: slow refill.	Ponding, subsides, frost action.	Erodes easily, ponding, soil blowing.	Wetness, erodes easily, rooting depth.
Pc*:						
Palms	Severe: seepage.	Severe: piping, ponding.	Severe: slow refill.	Ponding, subsides, frost action.	Erodes easily, ponding, soil blowing.	Wetness, erodes easily, rooting depth.
Carlisle	Severe: seepage.	Severe: excess humus, ponding.	Severe: slow refill.	Ponding, subsides, frost action.	Ponding, soil blowing.	Wetness.

See footnote at end of table.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
PnB---------------Paxton	Moderate: slope.	Severe: piping.	Severe: no water.	Deep to water	Percs slowly---	Rooting depth, percs slowly.
PnC, PnD----------Paxton	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, percs slowly.	Slope, rooting depth, percs slowly.
PoB---------------Paxton	Moderate: slope.	Severe: piping.	Severe: no water.	Deep to water	Percs slowly---	Rooting depth, percs slowly.
PoC, PoD----------Paxton	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, percs slowly.	Slope, rooting depth, percs slowly.
Pt*, Pv*. Pits						
Pw----------------Pompton	Severe: seepage.	Severe: piping, wetness.	Severe: slow refill, cutbanks cave.	Frost action---	Wetness--------	Wetness.
Ra----------------Raynham	Moderate: seepage.	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
RdA---------------Ridgebury	Slight---------	Severe: wetness, piping.	Severe: no water.	Percs slowly, frost action.	Wetness, percs slowly.	Wetness, percs slowly, rooting depth.
RdB---------------Ridgebury	Moderate: slope.	Severe: wetness, piping.	Severe: no water.	Slope, percs slowly, frost action.	Wetness, percs slowly.	Wetness, percs slowly, rooting depth.
RgB---------------Ridgebury	Moderate: slope.	Severe: piping, wetness.	Severe: no water.	Slope, percs slowly, frost action.	Wetness, percs slowly.	Wetness, percs slowly, rooting depth.
RhA, RhB----------Riverhead	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Too sandy------	Favorable.
RhC, RhD, RhE-----Riverhead	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, too sandy.	Slope.
SbB---------------Stockbridge	Moderate: slope.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily, percs slowly.	Erodes easily, percs slowly.
SbC, SbD----------Stockbridge	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
SgC*:						
Stockbridge------	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
Rock outcrop-----	Severe: depth to rock, slope.	---	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, depth to rock.

See footnote at end of table.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
Sh, Sm: Sun	Slight	Severe: wetness.	Severe: slow refill.	Percs slowly, frost action.	Wetness, percs slowly.	Wetness, rooting depth, percs slowly.
SuA: Sutton	Severe: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Frost action	Wetness	Favorable.
SuB: Sutton	Severe: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Frost action, slope.	Wetness	Favorable.
Ub*, Uc*. Udorthents						
UdB: Unadilla	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
Uf*: Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
UhB*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
Charlton	Severe: seepage.	Moderate: seepage, piping.	Severe: no water.	Deep to water	Favorable	Favorable.
UhC*, UhD*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
Charlton	Severe: slope, seepage.	Moderate: seepage, piping.	Severe: no water.	Deep to water	Slope	Slope.
UlC*, UlD*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
Charlton	Severe: slope, seepage.	Moderate: seepage, piping.	Severe: no water.	Deep to water	Slope	Slope.
Chatfield	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
UmC*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
Chatfield	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, droughty, depth to rock.
Rock outcrop	Severe: depth to rock, slope.	---	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, depth to rock.

See footnote at end of table.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
UpB*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
Paxton	Moderate: slope.	Severe: piping.	Severe: no water.	Deep to water	Percs slowly	Rooting depth, percs slowly.
UpC*, UpD*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
Paxton	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, percs slowly.	Slope, rooting depth, percs slowly.
UrB*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
Ridgebury	Moderate: slope.	Severe: wetness, piping.	Severe: no water.	Slope, percs slowly, frost action.	Wetness, percs slowly.	Wetness, percs slowly, rooting depth.
UvB*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
Riverhead	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Too sandy	Favorable.
UvC*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
Riverhead	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, too sandy.	Slope.
UwB*:						
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
Woodbridge	Moderate: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly.	Rooting depth, percs slowly.
WdA Woodbridge	Slight	Severe: piping.	Severe: no water.	Percs slowly, frost action.	Wetness, percs slowly.	Rooting depth, percs slowly.
WdB Woodbridge	Moderate: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly.	Rooting depth, percs slowly.
WdC Woodbridge	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Slope, wetness, percs slowly.	Slope, rooting depth, percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments >3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Ce-------------- Carlisle	0-60	Muck-------------	PT	A-8	0-30	---	---	---	---	---	---
ChB, ChC, ChD, ChE------------ Charlton	0-8	Loam-------------	SM, ML	A-2, A-4	0-5	85-95	75-90	50-85	25-65	<25	NP-5
	8-24	Fine sandy loam, sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-15	65-90	60-90	40-80	20-65	<25	NP-3
	24-60	Gravelly sandy loam, fine sandy loam, loam.	SM, GM	A-2, A-4	5-25	60-90	55-85	40-75	20-45	---	NP
ClB, ClC, ClD, ClE, ClF-------- Charlton	0-8	Very stony loam	SM, ML	A-2, A-4	10-20	75-95	70-90	60-85	30-70	<25	NP-5
	8-24	Fine sandy loam, sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-15	65-90	60-90	50-80	20-65	<25	NP-3
	24-60	Fine sandy loam, sandy loam, gravelly loam.	SM, GM	A-2, A-4	5-25	60-90	55-85	40-75	20-45	---	NP
CrC*:											
Charlton--------	0-8	Loam-------------	SM, ML	A-2, A-4	0-5	85-95	75-90	50-85	25-65	<25	NP-5
	8-24	Fine sandy loam, sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-15	65-90	60-90	40-80	20-65	<25	NP-3
	24-60	Gravelly sandy loam, fine sandy loam, loam.	SM, GM	A-2, A-4	5-25	60-90	55-85	40-75	20-45	---	NP
Chatfield-------	0-7	Loam-------------	SM, ML, SC-SM, CL-ML	A-4, A-2	0-5	80-95	75-90	50-80	25-65	10-20	1-6
	7-24	Flaggy silt loam, gravelly loam, flaggy sandy loam.	SM, ML, GM, CL-ML	A-4, A-2, A-1	0-10	60-95	55-90	35-75	15-75	10-20	1-6
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CsD*:											
Chatfield-------	0-7	Loam-------------	SM, ML, SC-SM, CL-ML	A-4, A-2	0-5	80-95	75-90	50-80	25-65	10-20	1-6
	7-24	Flaggy silt loam, gravelly loam, flaggy sandy loam.	SM, ML, GM, CL-ML	A-4, A-2, A-1	0-10	60-95	55-90	35-75	15-75	10-20	1-6
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
CsD*:											
Charlton--------	0-8	Loam-------------	SM, ML	A-2, A-4	0-5	85-95	75-90	50-85	25-65	<25	NP-5
	8-24	Fine sandy loam, sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-15	65-90	60-90	40-80	20-65	<25	NP-3
	24-60	Gravelly sandy loam, fine sandy loam, loam.	SM, GM	A-2, A-4	5-25	60-90	55-85	40-75	20-45	---	NP
CtC*, CuD*:											
Chatfield-------	0-7	Loam-------------	SM, ML, SC-SM, CL-ML	A-4, A-2	0-5	80-95	75-90	50-80	25-65	10-20	1-6
	7-24	Flaggy silt loam, gravelly loam, flaggy sandy loam.	SM, ML, GM, CL-ML	A-4, A-2, A-1	0-10	60-95	55-90	35-75	15-75	10-20	1-6
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Hollis----------	0-1	Fine sandy loam	SM, ML	A-2, A-4	0-5	85-100	75-95	50-85	25-65	<25	NP-5
	1-16	Gravelly sandy loam, fine sandy loam, loam.	SM, ML, GM	A-2, A-4	0-15	65-100	60-95	40-80	20-65	<25	NP-5
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Ff*:											
Fluvaquents-----	0-5	Silt loam--------	ML, SM, CL, GM	A-1, A-2, A-4	0-10	60-100	55-100	30-100	10-90	<25	NP-15
	5-72	Very gravelly sand, gravelly silt loam, silty clay loam.	GM, ML, SC-SM, CL	A-1, A-2, A-6	0-15	35-100	30-100	15-100	5-90	<30	NP-20
Udifluvents-----	0-4	Gravelly silt loam.	ML, SM, CL, GM	A-1, A-2, A-4	0-10	60-80	55-75	30-75	10-65	<25	NP-20
	4-70	Very gravelly sand, gravelly loam, silty clay loam.	GM, ML, SP, CL	A-1, A-2, A-4, A-6	0-15	35-100	30-100	15-100	5-90	<30	NP-20
Fr--------------- Fredon	0-7	Silt loam--------	ML, CL, SC, SM	A-2, A-4, A-1	0-2	80-100	75-95	30-90	15-70	20-30	NP-10
	7-24	Loam, silt loam, gravelly sandy loam.	SM, GC, ML, CL	A-2, A-4, A-1	0-2	60-100	50-95	30-85	15-70	20-30	NP-10
	24-60	Stratified very gravelly sand to loamy fine sand.	GP, GM, GW, GW-GM	A-1, A-2	0-5	30-90	25-85	10-60	0-35	---	NP

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
HnB, HnC, HnD---- Hinckley	0-7	Gravelly loamy sand.	SM, SP-SM, GM, GP-GM	A-1, A-2	0-10	60-85	50-75	25-60	10-35	<20	NP
	7-17	Gravelly loamy sand, loamy fine sand, very gravelly loamy coarse sand.	SM, GM, GP-GM, SP-SM	A-1, A-2, A-3	0-20	50-95	30-85	15-70	2-30	<20	NP
	17-60	Stratified very gravelly loamy fine sand to cobbly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	5-25	50-65	30-50	10-40	0-20	<10	NP
HrF*:											
Hollis----------	0-1	Fine sandy loam	SM, ML	A-2, A-4	0-5	85-100	75-95	50-85	25-65	<25	NP-5
	1-16	Gravelly sandy loam, fine sandy loam, loam.	SM, ML, GM	A-2, A-4	0-15	65-100	60-95	40-80	20-65	<25	NP-5
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Ip-------------- Ipswich	0-8	Mucky peat-------	PT	A-8	0	---	---	---	---	---	NP
	8-20	Mucky peat-------	PT	A-8	0	---	---	---	---	---	NP
	20-60	Muck, mucky peat	PT	A-8	0	---	---	---	---	---	NP
KnB, KnC--------- Knickerbocker	0-9	Fine sandy loam	SM, ML	A-2, A-4, A-1-b	0	75-100	75-100	40-85	20-55	---	NP
	9-31	Fine sandy loam, sandy loam.	SM, ML	A-2, A-4, A-1-b	0	75-100	75-100	40-85	20-55	---	NP
	31-45	Loamy fine sand, loamy sand.	SP-SM, SM	A-1-b, A-2-4	0	75-100	75-100	40-75	10-30	---	NP
	45-60	Loamy fine sand, gravelly loamy sand, gravelly sand.	SP-SM, SM	A-1, A-2-4, A-3	0-5	60-100	55-100	30-70	5-15	---	NP
LcA, LcB--------- Leicester	0-8	Stony loam-------	SM, ML, GM	A-2, A-4	5-15	65-95	60-90	40-85	25-70	<25	NP-5
	8-26	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, GM	A-1, A-2, A-4	0-15	65-90	60-85	40-75	20-55	<25	NP
	26-40	Gravelly fine sandy loam, fine sandy loam, gravelly sandy loam.	SM, GM	A-1, A-2, A-4	5-25	65-90	55-85	35-70	20-45	---	NP
	40-60	Gravelly fine sandy loam, fine sandy loam, very gravelly sandy loam.	SM, GM	A-1, A-2, A-4	5-25	50-90	40-85	30-70	15-45	---	NP

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments >3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
LeB-------------- Leicester	0-8	Very stony loam	SM, ML, GM	A-2, A-4	10-20	65-95	60-90	40-85	25-70	<25	NP-5
	8-26	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, GM	A-1, A-2, A-4	0-15	65-90	60-85	40-75	20-55	<25	NP
	26-60	Gravelly fine sandy loam, fine sandy loam, very gravelly sandy loam.	SM, GM	A-1, A-2, A-4	5-25	50-90	40-85	30-70	15-45	---	NP
Pa--------------- Palms	0-18	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	18-48	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	48-60	Clay loam, silty clay loam, gravelly sandy loam.	CL-ML, CL, SC, SC-SM	A-4, A-6, A-7, A-2	0	85-100	60-100	35-95	15-90	20-45	5-20
Pc*:											
Palms-----------	0-18	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	18-48	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	48-60	Clay loam, silty clay loam, gravelly sandy loam.	CL-ML, CL, SC, SC-SM	A-4, A-6, A-7, A-2	0	85-100	60-100	35-95	15-90	20-45	5-20
Carlisle--------	0-60	Muck-------------	PT	A-8	0-30	---	---	---	---	---	---
PnB, PnC, PnD---- Paxton	0-10	Fine sandy loam	SM, ML, GM	A-2, A-4	0-10	85-95	75-90	50-80	20-65	<40	NP-10
	10-20	Fine sandy loam, loam, sandy loam.	SM, ML, GM	A-2, A-4	0-15	65-95	60-90	45-80	25-65	<30	NP-7
	20-60	Fine sandy loam, loam, sandy loam.	SM, ML, GM	A-1, A-2, A-4	0-15	65-95	60-90	40-75	20-60	<30	NP-7
PoB, PoC, PoD---- Paxton	0-10	Very stony fine sandy loam.	SM, ML, GM	A-2, A-4	5-20	65-95	60-90	40-80	25-65	<40	NP-10
	10-20	Fine sandy loam, loam, sandy loam.	SM, ML, GM	A-2, A-4	0-15	65-95	60-90	45-80	25-65	<30	NP-7
	20-60	Fine sandy loam, loam, sandy loam.	SM, ML, GM	A-1, A-2, A-4	0-15	65-95	60-90	40-75	20-60	<30	NP-7
Pt*, Pv* Pits											
Pw--------------- Pompton	0-8	Silt loam--------	SM, SC, ML	A-4	0	85-95	85-95	65-75	35-60	20-30	3-10
	8-28	Fine sandy loam, sandy loam, gravelly sandy loam.	SM, SC, SC-SM	A-2, A-4	0	80-95	50-90	45-75	30-50	20-30	3-10
	28-60	Gravelly fine sandy loam, gravelly loam, silt loam.	ML, GM, SM	A-2, A-4	0-5	60-95	55-95	40-90	25-85	20-30	1-10

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments >3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Ra---------------- Raynham	0-12	Silt loam--------	ML, CL-ML	A-4	0	100	95-100	80-100	55-95	<25	NP-5
	12-32	Silt loam, silt, very fine sandy loam.	ML, CL-ML	A-4	0	100	95-100	80-100	55-95	<25	NP-5
	32-60	Silt loam, silt, very fine sandy loam.	ML, CL-ML	A-4	0	100	95-100	80-100	70-95	<25	NP-5
RdA, RdB--------- Ridgebury	0-8	Loam-------------	SM, ML	A-1, A-2, A-4	0-5	80-100	75-90	40-90	20-70	---	NP
	8-26	Sandy loam, gravelly loam.	SM, ML, GM	A-1, A-2, A-4	0-15	65-95	55-90	40-80	20-60	---	NP
	26-60	Sandy loam, gravelly loam.	SM, ML, GM	A-1, A-2, A-4	0-15	65-95	55-90	35-80	20-60	---	NP
RgB-------------- Ridgebury	0-8	Very stony loam	SM, ML	A-2, A-4	5-20	70-100	60-90	45-85	25-65	---	NP
	8-26	Sandy loam, gravelly loam.	SM, ML, GM	A-1, A-2, A-4	0-15	65-95	55-90	40-80	20-60	---	NP
	26-60	Sandy loam, gravelly loam.	SM, ML, GM	A-1, A-2, A-4	0-15	65-95	55-90	35-80	20-60	---	NP
RhA, RhB, RhC, RhD, RhE-------- Riverhead	0-6	Loam-------------	SM, ML	A-2, A-4	0-5	95-100	90-100	55-95	30-75	14-18	1-3
	6-25	Sandy loam, fine sandy loam, gravelly sandy loam.	SM, GM	A-2, A-4, A-1	0-5	65-100	60-95	40-80	20-45	14-18	1-3
	25-30	Loamy sand, gravelly loamy sand, fine sandy loam.	SM, SP-SM, GM, GP-GM	A-1, A-2, A-4	0-5	60-90	55-85	30-70	10-45	---	NP
	30-60	Stratified sand and gravel.	SP, SW, SP-SM, GP	A-1	0-10	40-95	35-90	25-50	0-10	---	NP
SbB, SbC, SbD---- Stockbridge	0-12	Silt loam--------	ML, CL-ML	A-4	0-10	80-95	75-90	65-85	50-75	20-40	3-12
	12-16	Loam, silt loam, gravelly loam.	ML, CL-ML	A-4	0-10	70-95	65-90	60-85	50-75	20-40	3-12
	16-36	Gravelly loam, loam, silt loam.	ML, CL-ML	A-4	0-10	60-95	60-85	55-80	50-75	20-40	3-12
	36-60	Gravelly loam, silt loam, very gravelly fine sandy loam.	ML, CL-ML, SM, GM	A-2, A-4	0-10	50-90	35-85	30-80	25-75	15-40	NP-12
SgC*: Stockbridge-----	0-12	Silt loam--------	ML, CL-ML	A-4	0-10	80-95	75-90	65-85	50-75	20-40	3-12
	12-16	Loam, silt loam, gravelly loam.	ML, CL-ML	A-4	0-10	70-95	65-90	60-85	50-75	20-40	3-12
	16-36	Gravelly loam, loam, silt loam.	ML, CL-ML	A-4	0-10	60-95	60-85	55-80	50-75	20-40	3-12
	36-60	Gravelly loam, silt loam, very gravelly fine sandy loam.	ML, CL-ML, SM, GM	A-2, A-4	0-10	50-90	35-85	30-80	25-75	15-40	NP-12
Rock outcrop----	0-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Sh: Sun	0-9	Loam	ML, CL-ML, SM, SC-SM	A-1, A-2, A-4	0-5	80-100	75-100	45-95	20-85	<10	NP-5
	9-27	Gravelly fine sandy loam, sandy loam, silt loam.	GM, ML, SM, SC-SM	A-1, A-2, A-4	0-5	55-95	50-90	30-85	15-65	<10	NP-5
	27-60	Gravelly fine sandy loam, gravelly loam, very gravelly sandy loam.	GM, GM-GC, SM, SC-SM	A-1, A-2, A-4	0-5	45-75	40-70	25-65	15-50	<10	NP-5
Sm: Sun	0-9	Extremely stony loam.	GM, SM, ML, GM-GC	A-1, A-2, A-4	5-25	55-75	50-70	30-65	15-60	<10	NP-5
	9-27	Gravelly fine sandy loam, sandy loam, silt loam.	GM, SM, ML, GM-GC	A-1, A-2, A-4	0-5	55-95	50-90	30-85	15-65	<10	NP-5
	27-60	Gravelly fine sandy loam, gravelly loam, very gravelly sandy loam.	GM, GM-GC, SM, SC-SM	A-1, A-2, A-4	0-5	45-75	40-70	25-65	15-50	<10	NP-5
SuA, SuB: Sutton	0-9	Loam	SM, ML	A-2, A-4	0-10	85-95	75-90	50-80	25-65	<30	NP-5
	9-26	Fine sandy loam, loam, gravelly fine sandy loam.	SM, ML, GM	A-2, A-4	0-15	65-95	60-90	40-80	25-65	<25	NP-3
	26-60	Gravelly fine sandy loam, gravelly sandy loam, sandy loam.	SM, ML, GM	A-1, A-2, A-4	5-25	60-90	55-85	40-75	20-60	---	NP
Ub*, Uc*. Udorthents											
UdB: Unadilla	0-13	Silt loam	ML	A-4	0	100	95-100	90-100	70-90	<35	NP-10
	13-32	Silt loam, very fine sandy loam.	ML, CL-ML	A-4	0	100	95-100	90-100	70-90	<25	NP-10
	32-60	Very gravelly sand, gravelly sand, fine sandy loam.	GM, GP, SM, SP	A-2, A-1, A-3	0-10	35-100	25-95	10-70	1-40	---	NP
Uf*: Urban land	0-6	Variable	---	---	---	---	---	---	---	---	---
UhB*, UhC*, UhD*: Urban land	0-6	Variable	---	---	---	---	---	---	---	---	---
Charlton	0-8	Loam	SM, ML	A-2, A-4	0-5	85-95	75-90	50-85	25-65	<25	NP-5
	8-24	Fine sandy loam, sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-15	65-90	60-90	40-80	20-65	<25	NP-3
	24-60	Gravelly sandy loam, fine sandy loam, loam.	SM, GM	A-2, A-4	5-25	60-90	55-85	40-75	20-45	---	NP

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
UlC*, UlD*:											
Urban land------	0-6	Variable---------	---	---	---	---	---	---	---	---	---
Charlton--------	0-8	Loam-------------	SM, ML	A-2, A-4	0-5	85-95	75-90	50-85	25-65	<25	NP-5
	8-24	Fine sandy loam, gravelly fine sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-15	65-90	60-90	40-80	20-65	<25	NP-3
	24-60	Gravelly sandy loam, gravelly fine sandy loam, loam.	SM, GM	A-2, A-4	5-25	60-90	55-85	40-75	20-45	---	NP
Chatfield-------	0-8	Loam-------------	SM, ML, SC-SM, CL-ML	A-4, A-2	0-5	80-95	75-90	50-80	25-65	10-20	1-6
	8-24	Flaggy silt loam, gravelly loam, flaggy sandy loam.	SM, ML, GM, CL-ML	A-4, A-2, A-1	0-10	60-95	55-90	35-75	15-75	10-20	1-6
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
UmC*:											
Urban land------	0-6	Variable---------	---	---	---	---	---	---	---	---	---
Chatfield-------	0-8	Loam-------------	SM, ML, SC-SM, CL-ML	A-4, A-2	0-5	80-95	75-90	50-80	25-65	10-20	1-6
	8-24	Flaggy silt loam, gravelly loam, flaggy sandy loam.	SM, ML, GM, CL-ML	A-4, A-2, A-1	0-10	60-95	55-90	35-75	15-75	10-20	1-6
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
UpB*, UpC*, UpD*:											
Urban land------	0-6	Variable---------	---	---	---	---	---	---	---	---	---
Paxton----------	0-10	Fine sandy loam	SM, ML, GM	A-2, A-4	0-10	85-95	75-90	50-80	20-65	<40	NP-10
	10-20	Fine sandy loam, loam, sandy loam.	SM, ML, GM	A-2, A-4	0-15	65-95	60-90	45-80	25-65	<30	NP-7
	20-60	Fine sandy loam, loam, sandy loam.	SM, ML, GM	A-1, A-2, A-4	0-15	65-95	60-90	40-75	20-60	<30	NP-7
UrB*:											
Urban land------	0-6	Variable---------	---	---	---	---	---	---	---	---	---
Ridgebury-------	0-8	Loam-------------	SM, ML	A-1, A-2, A-4	0-5	80-100	75-90	40-90	20-70	---	NP
	8-26	Sandy loam, gravelly loam.	SM, ML, GM	A-1, A-2, A-4	0-15	65-95	55-90	40-80	20-60	---	NP
	26-60	Sandy loam, gravelly loam.	SM, ML, GM	A-1, A-2, A-4	0-15	65-95	55-90	35-80	20-60	---	NP

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments >3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
UvB*, UvC*:											
Urban land	0-6	Variable	---	---	---	---	---	---	---	---	---
Riverhead	0-6	Loam	SM, ML	A-2, A-4	0-5	95-100	90-100	55-95	30-75	14-18	1-3
	6-25	Sandy loam, fine sandy loam, gravelly sandy loam.	SM, GM	A-2, A-4, A-1	0-5	65-100	60-95	40-80	20-45	14-18	1-3
	25-30	Loamy sand, gravelly loamy sand, fine sandy loam.	SM, SP-SM, GM, GP-GM	A-1, A-2, A-4	0-5	60-90	55-85	30-70	10-45	---	NP
	30-60	Stratified sand and gravel.	SP, SW, SP-SM, GP	A-1	0-10	40-95	35-90	25-50	0-10	---	NP
UwB*:											
Urban land	0-6	Variable	---	---	---	---	---	---	---	---	---
Woodbridge	0-12	Loam	SM, ML	A-2, A-4	0-10	85-95	75-90	50-80	25-65	<40	NP-10
	12-29	Fine sandy loam, loam, gravelly fine sandy loam.	SM, ML, GM	A-2, A-4	0-15	65-95	60-90	45-80	25-65	<30	NP-7
	29-60	Fine sandy loam, loam, gravelly fine sandy loam.	SM, ML, GM	A-1, A-2, A-4	0-15	65-95	60-90	40-75	20-60	<30	NP-7
WdA, WdB, WdC Woodbridge	0-12	Loam	SM, ML	A-2, A-4	0-10	85-95	75-90	50-80	25-65	<40	NP-10
	12-29	Fine sandy loam, loam, gravelly fine sandy loam.	SM, ML, GM	A-2, A-4	0-15	65-95	60-90	45-80	25-65	<30	NP-7
	29-60	Fine sandy loam, loam, gravelly fine sandy loam.	SM, ML, GM	A-1, A-2, A-4	0-15	65-95	60-90	40-75	20-60	<30	NP-7

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Ce: Carlisle	0-60	---	0.13-0.23	0.2-6.0	0.35-0.45	5.6-7.8	---------------	----	5	>70
ChB, ChC, ChD, ChE: Charlton	0-8	3-8	1.00-1.25	0.6-6.0	0.08-0.23	4.5-6.0	Low	0.24	3	2-5
	8-24	3-8	1.40-1.65	0.6-6.0	0.07-0.20	4.5-6.0	Low	0.24		
	24-60	1-8	1.45-1.70	0.6-6.0	0.05-0.16	4.5-6.0	Low	0.24		
ClB, ClC, ClD, ClE, ClF: Charlton	0-8	3-8	1.00-1.25	0.6-6.0	0.08-0.23	4.5-6.0	Low	0.20	3	---
	8-24	3-8	1.40-1.65	0.6-6.0	0.07-0.20	4.5-6.0	Low	0.24		
	24-60	1-8	1.45-1.70	0.6-6.0	0.05-0.16	4.5-6.0	Low	0.24		
CrC*: Charlton	0-8	3-8	1.00-1.25	0.6-6.0	0.08-0.23	4.5-6.0	Low	0.24	3	2-5
	8-24	3-8	1.40-1.65	0.6-6.0	0.07-0.20	4.5-6.0	Low	0.24		
	24-60	1-8	1.45-1.70	0.6-6.0	0.05-0.16	4.5-6.0	Low	0.24		
Chatfield	0-7	7-18	1.10-1.40	0.6-6.0	0.12-0.16	4.5-6.0	Low	0.24	3	2-10
	7-24	7-18	1.20-1.50	0.6-6.0	0.08-0.18	4.5-6.0	Low	0.20		
	24	---	---	---	---	---	---------------	----		
CsD*: Chatfield	0-7	7-18	1.10-1.40	0.6-6.0	0.12-0.16	4.5-6.0	Low	0.24	3	2-10
	7-24	7-18	1.20-1.50	0.6-6.0	0.08-0.18	4.5-6.0	Low	0.20		
	24	---	---	---	---	---	---------------	----		
Charlton	0-8	3-8	1.00-1.25	0.6-6.0	0.08-0.23	4.5-6.0	Low	0.24	3	2-5
	8-24	3-8	1.40-1.65	0.6-6.0	0.07-0.20	4.5-6.0	Low	0.24		
	24-60	1-8	1.45-1.70	0.6-6.0	0.05-0.16	4.5-6.0	Low	0.24		
CtC*, CuD*: Chatfield	0-7	7-18	1.10-1.40	0.6-6.0	0.12-0.16	4.5-6.0	Low	0.24	3	2-10
	7-24	7-18	1.20-1.50	0.6-6.0	0.08-0.18	4.5-6.0	Low	0.20		
	24	---	---	---	---	---	---------------	----		
Hollis	0-1	3-10	1.10-1.40	0.6-6.0	0.12-0.20	4.5-6.0	Low	0.24	1	2-5
	1-16	1-8	1.30-1.55	0.6-6.0	0.06-0.18	4.5-6.0	Low	0.32		
	16	---	---	---	---	---	---------------	----		
Rock outcrop	0-60	---	---	---	---	---	---------------	----	---	---
Ff*: Fluvaquents	0-5	5-28	1.10-1.50	0.2-20	0.06-0.18	4.5-7.3	Low	0.32	3	0-5
	5-72	2-35	1.20-1.60	0.06-20	0.03-0.16	4.5-8.4	Low	0.28		
Udifluvents	0-4	5-28	1.10-1.50	0.2-20	0.03-0.15	4.5-7.3	Low	0.28	3	0-3
	4-70	2-35	1.20-1.70	0.06-20	0.03-0.16	4.5-8.4	Low	----		
Fr: Fredon	0-7	7-20	1.20-1.40	0.6-2.0	0.12-0.20	5.6-7.3	Low	0.28	3	3-5
	7-24	7-20	1.20-1.40	0.2-2.0	0.12-0.20	5.6-7.3	Low	0.24		
	24-60	2-10	1.30-1.50	6.0-20	0.02-0.06	6.1-8.4	Low	0.10		
HnB, HnC, HnD: Hinckley	0-7	4-8	1.00-1.20	6.0-20	0.06-0.12	3.6-6.0	Low	0.17	3	2-7
	7-17	1-5	1.20-1.40	6.0-20	0.01-0.10	3.6-6.0	Low	0.17		
	17-60	0-3	1.30-1.50	>20	0.01-0.06	3.6-6.0	Low	0.10		

See footnote at end of table.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
HrF*:										
Hollis----------	0-1	3-10	1.10-1.40	0.6-6.0	0.12-0.20	4.5-6.0	Low----------	0.24	1	2-5
	1-16	1-8	1.30-1.55	0.6-6.0	0.06-0.18	4.5-6.0	Low----------	0.32		
	16	---	---	---	---	---	-------------	----		
Rock outcrop----	0-60	---	---	---	---	---	-------------	----	---	---
Ip--------------- Ipswich	0-8	---	0.10-0.30	0.6-20	0.18-0.35	5.1-7.3	-------------	----	---	---
	8-20	---	0.10-0.30	0.6-20	0.18-0.35	5.1-7.3	-------------	----		
	20-60	---	0.10-0.30	0.6-20	0.18-0.35	5.1-7.3	-------------	----		
KnB, KnC--------- Knickerbocker	0-9	5-12	1.10-1.40	2.0-6.0	0.11-0.17	4.5-6.0	Low----------	0.20	3	4-6
	9-31	5-12	1.25-1.55	2.0-6.0	0.11-0.17	4.5-6.0	Low----------	0.20		
	31-45	2-8	1.45-1.65	>6.0	0.06-0.08	4.5-6.0	Low----------	0.17		
	45-60	2-8	1.45-1.65	>6.0	0.02-0.08	4.5-6.0	Low----------	0.10		
LcA, LcB--------- Leicester	0-8	3-10	1.00-1.25	0.6-6.0	0.12-0.20	4.5-5.5	Low----------	0.24	3	---
	8-26	3-10	1.35-1.60	0.6-6.0	0.10-0.20	4.5-5.5	Low----------	0.28		
	26-40	2-7	1.45-1.70	0.6-20.0	0.08-0.16	4.5-5.5	Low----------	0.24		
	40-60	2-7	1.45-1.70	0.6-20.0	0.06-0.16	4.5-6.0	Low----------	0.24		
LeB-------------- Leicester	0-8	3-10	1.00-1.25	0.6-6.0	0.12-0.18	4.5-5.5	Low----------	0.24	3	---
	8-26	3-10	1.35-1.60	0.6-6.0	0.10-0.20	4.5-5.5	Low----------	0.28		
	26-60	2-7	1.45-1.70	0.6-20.0	0.06-0.16	4.5-6.0	Low----------	0.24		
Pa--------------- Palms	0-18	---	0.30-0.40	0.2-6.0	0.35-0.45	5.1-7.8	-------------	----	5	>75
	18-48	---	0.15-0.30	0.2-6.0	0.35-0.45	5.1-7.8	-------------	----		
	48-60	7-35	1.45-1.75	0.2-2.0	0.14-0.22	6.1-8.4	Low----------	0.37		
Pc*:										
Palms-----------	0-18	---	0.30-0.40	0.2-6.0	0.35-0.45	5.1-7.8	-------------	----	5	>75
	18-48	---	0.15-0.30	0.2-6.0	0.35-0.45	5.1-7.8	-------------	----		
	48-60	7-35	1.45-1.75	0.2-2.0	0.14-0.22	6.1-8.4	Low----------	0.37		
Carlisle--------	0-60	---	0.13-0.23	0.2-6.0	0.35-0.45	4.5-7.8	-------------	----	5	>70
PnB, PnC, PnD---- Paxton	0-10	3-12	1.00-1.25	0.6-2.0	0.10-0.20	4.5-6.0	Low----------	0.24	3	2-5
	10-20	3-12	1.35-1.60	0.6-2.0	0.08-0.18	4.5-6.0	Low----------	0.32		
	20-60	3-12	1.70-2.00	<0.2	0.05-0.10	4.5-6.0	Low----------	0.24		
PoB, PoC, PoD---- Paxton	0-10	3-12	1.00-1.25	0.6-2.0	0.08-0.18	4.5-6.0	Low----------	0.20	3	---
	10-20	3-12	1.35-1.60	0.6-2.0	0.08-0.18	4.5-6.0	Low----------	0.32		
	20-60	3-12	1.70-2.00	<0.2	0.05-0.10	4.5-6.0	Low----------	0.24		
Pt*, Pv*. Pits										
Pw--------------- Pompton	0-8	8-18	1.15-1.45	0.6-6.0	0.14-0.18	4.5-6.0	Low----------	0.24	3	2-4
	8-28	10-18	1.50-1.65	0.6-6.0	0.12-0.16	4.5-5.5	Low----------	0.24		
	28-60	8-18	1.50-1.75	0.2-2.0	0.10-0.18	4.5-6.0	Low----------	0.24		
Ra--------------- Raynham	0-12	3-16	1.20-1.50	0.2-2.0	0.18-0.24	5.1-7.3	Low----------	0.49	3	3-10
	12-32	3-16	1.20-1.50	0.2-2.0	0.18-0.22	5.1-7.3	Low----------	0.64		
	32-60	3-16	1.20-1.60	0.06-0.2	0.17-0.21	5.6-7.8	Low----------	0.64		
RdA, RdB--------- Ridgebury	0-8	3-10	1.00-1.30	0.6-6.0	0.06-0.24	4.5-6.5	Low----------	0.24	3	4-7
	8-26	2-8	1.60-1.90	0.6-6.0	0.04-0.20	4.5-6.5	Low----------	0.32		
	26-60	2-8	1.80-2.00	<0.2	0.01-0.05	4.5-6.5	Low----------	0.24		
RgB-------------- Ridgebury	0-8	3-10	1.00-1.30	0.6-6.0	0.06-0.24	4.5-6.5	Low----------	0.20	3	4-7
	8-26	2-8	1.60-1.90	0.6-6.0	0.04-0.20	4.5-6.5	Low----------	0.32		
	26-60	2-8	1.80-2.00	<0.2	0.01-0.05	4.5-6.5	Low----------	0.24		

See footnote at end of table.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
RhA, RhB, RhC, RhD, RhE-------- Riverhead	0-6	3-10	1.10-1.40	2.0-6.0	0.14-0.20	4.5-6.0	Low----------	0.28	3	2-4
	6-25	1-8	1.25-1.55	2.0-6.0	0.09-0.13	3.6-6.0	Low----------	0.28		
	25-30	1-8	1.25-1.55	2.0-6.0	0.04-0.13	4.5-6.0	Low----------	0.17		
	30-60	1-8	1.45-1.65	>20	0.02-0.04	4.5-7.3	Low----------	0.17		
SbB, SbC, SbD---- Stockbridge	0-12	5-18	1.00-1.25	0.6-2.0	0.14-0.24	5.1-7.3	Low----------	0.28	3	2-6
	12-16	5-18	1.40-1.65	0.6-2.0	0.12-0.22	5.6-7.3	Low----------	0.37		
	16-36	5-18	1.60-1.85	0.06-0.6	0.08-0.18	5.6-7.3	Low----------	0.24		
	36-60	3-18	1.60-1.85	0.06-0.6	0.07-0.17	5.6-8.4	Low----------	0.24		
SgC*:										
Stockbridge-----	0-12	5-18	1.00-1.25	0.6-2.0	0.14-0.24	5.1-7.3	Low----------	0.28	3	2-6
	12-16	5-18	1.40-1.65	0.6-2.0	0.12-0.22	5.6-7.3	Low----------	0.37		
	16-36	5-18	1.60-1.85	0.06-0.6	0.08-0.18	5.6-7.3	Low----------	0.24		
	36-60	3-18	1.60-1.85	0.06-0.6	0.07-0.17	5.6-8.4	Low----------	0.24		
Rock outcrop----	0-60	---	---	---	---	---	-------------	----	---	---
Sh--------------- Sun	0-9	5-18	1.10-1.40	0.6-2.0	0.12-0.21	5.1-6.5	Low----------	0.28	5	3-15
	9-27	5-18	1.20-1.50	<0.2	0.08-0.15	5.6-7.3	Low----------	0.20		
	27-60	5-18	1.55-1.75	<0.2	0.06-0.12	6.6-8.4	Low----------	0.20		
Sm--------------- Sun	0-9	5-18	1.10-1.40	0.6-2.0	0.09-0.17	5.1-6.5	Low----------	0.20	5	---
	9-27	5-18	1.20-1.50	<0.2	0.08-0.15	5.6-7.3	Low----------	0.20		
	27-60	5-18	1.55-1.75	<0.2	0.06-0.12	6.6-8.4	Low----------	0.20		
SuA-------------- Sutton	0-9	3-10	1.00-1.25	0.6-6.0	0.12-0.20	4.5-6.0	Low----------	0.24	3	2-7
	9-27	3-10	1.35-1.60	0.6-6.0	0.08-0.18	4.5-6.0	Low----------	0.28		
	27-60	2-6	1.45-1.70	0.6-6.0	0.06-0.16	4.5-6.0	Low----------	0.24		
SuB-------------- Sutton	0-9	3-10	1.00-1.25	0.6-6.0	0.12-0.20	4.5-6.0	Low----------	0.24	3	2-7
	9-26	3-10	1.35-1.60	0.6-6.0	0.08-0.18	4.5-6.0	Low----------	0.28		
	26-60	2-6	1.45-1.70	0.6-6.0	0.06-0.16	4.5-6.0	Low----------	0.24		
Ub*, Uc*. Udorthents										
UdB-------------- Unadilla	0-13	2-18	1.20-1.50	0.6-2.0	0.18-0.21	4.5-6.0	Low----------	0.49	3	2-7
	13-32	1-18	1.20-1.50	0.6-2.0	0.17-0.20	4.5-6.0	Low----------	0.64		
	32-60	1-3	1.45-1.65	2.0-20	0.01-0.10	5.1-7.8	Low----------	0.17		
Uf*-------------- Urban land	0-6	---	---	---	---	---	-------------	----	---	---
UhB*, UhC*, UhD*:										
Urban land------	0-6	---	---	---	---	---	-------------	----	---	---
Charlton--------	0-8	3-8	1.00-1.25	0.6-6.0	0.08-0.23	4.5-6.0	Low----------	0.24	3	2-5
	8-24	3-8	1.40-1.65	0.6-6.0	0.07-0.20	4.5-6.0	Low----------	0.24		
	24-60	1-8	1.45-1.70	0.6-6.0	0.05-0.16	4.5-6.0	Low----------	0.24		
UlC*, UlD*:										
Urban land------	0-6	---	---	---	---	---	-------------	----	---	---
Charlton--------	0-8	3-8	1.00-1.25	0.6-6.0	0.08-0.23	4.5-6.0	Low----------	0.24	3	2-5
	8-24	3-8	1.40-1.65	0.6-6.0	0.07-0.20	4.5-6.0	Low----------	0.24		
	24-60	1-8	1.45-1.70	0.6-6.0	0.05-0.16	4.5-6.0	Low----------	0.24		
Chatfield-------	0-8	7-18	1.10-1.40	0.6-6.0	0.12-0.16	4.5-6.0	Low----------	0.24	3	2-10
	8-24	7-18	1.20-1.50	0.6-6.0	0.08-0.18	4.5-6.0	Low----------	0.20		
	24	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
UmC*:										
Urban land------	0-6	---	---	---	---	---	-------------	----	---	---
Chatfield-------	0-8	7-18	1.10-1.40	0.6-6.0	0.12-0.16	4.5-6.0	Low----------	0.24	3	2-10
	8-24	7-18	1.20-1.50	0.6-6.0	0.08-0.18	4.5-6.0	Low----------	0.20		
	24	---	---	---	---	---	-------------	----		
Rock outcrop----	0-60	---	---	---	---	---	-------------	----	---	---
UpB*, UpC*, UpD*:										
Urban land------	0-6	---	---	---	---	---	-------------	----	---	---
Paxton----------	0-10	3-12	1.00-1.25	0.6-2.0	0.10-0.20	4.5-6.0	Low----------	0.24	3	2-5
	10-20	3-12	1.35-1.60	0.6-2.0	0.08-0.18	4.5-6.0	Low----------	0.32		
	20-60	3-12	1.70-2.00	<0.2	0.05-0.10	4.5-6.0	Low----------	0.24		
UrB*:										
Urban land------	0-6	---	---	---	---	---	-------------	----	---	---
Ridgebury-------	0-8	3-10	1.00-1.30	0.6-6.0	0.06-0.24	4.5-6.5	Low----------	0.24	3	4-7
	8-26	2-8	1.60-1.90	0.6-6.0	0.04-0.20	4.5-6.5	Low----------	0.32		
	26-60	2-8	1.80-2.00	<0.2	0.01-0.05	4.5-6.5	Low----------	0.24		
UvB*, UvC*:										
Urban land------	0-6	---	---	---	---	---	-------------	----	---	---
Riverhead-------	0-6	3-10	1.10-1.40	2.0-6.0	0.14-0.20	3.6-6.0	Low----------	0.28	3	2-4
	6-25	1-8	1.25-1.55	2.0-6.0	0.09-0.13	3.6-6.0	Low----------	0.28		
	25-30	1-8	1.25-1.55	2.0-6.0	0.04-0.13	4.5-6.0	Low----------	0.17		
	30-60	1-8	1.45-1.65	>20	0.02-0.04	4.5-7.3	Low----------	0.17		
UwB*:										
Urban land------	0-6	---	---	---	---	---	-------------	----	---	---
Woodbridge------	0-12	3-12	1.00-1.25	0.6-2.0	0.10-0.20	4.5-6.0	Low----------	0.24	3	2-6
	12-29	3-12	1.35-1.60	0.6-2.0	0.08-0.18	4.5-6.0	Low----------	0.32		
	29-60	3-12	1.70-2.00	<0.2	0.05-0.10	4.5-6.0	Low----------	0.24		
WdA, WdB, WdC---- Woodbridge	0-12	3-12	1.00-1.25	0.6-2.0	0.10-0.20	4.5-6.0	Low----------	0.24	3	2-6
	12-29	3-12	1.35-1.60	0.6-2.0	0.08-0.18	4.5-6.0	Low----------	0.32		
	29-60	3-12	1.70-2.00	<0.2	0.05-0.10	4.5-6.0	Low----------	0.24		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In				
Ce: Carlisle	A/D	None	---	---	+.5-1.0	Apparent	Sep-Jun	>60	---	High	High	Low.
ChB, ChC, ChD, ChE, ClB, ClC, ClD, ClE, ClF: Charlton	B	None	---	---	>6.0	---	---	>60	---	Low	Low	High.
CrC*:												
Charlton	B	None	---	---	>6.0	---	---	>60	---	Low	Low	High.
Chatfield	B	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Low	Moderate.
CsD*:												
Chatfield	B	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Low	Moderate.
Charlton	B	None	---	---	>6.0	---	---	>60	---	Low	Low	High.
CtC*, CuD*:												
Chatfield	B	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Low	Moderate.
Hollis	C/D	None	---	---	>6.0	---	---	10-20	Hard	Moderate	Low	High.
Rock outcrop	D	None	---	---	>6.0	---	---	0	Hard	---	---	---
Ff*:												
Fluvaquents	D	Frequent	Brief to long.	Sep-Jul	+.5-1.5	Apparent	Oct-Jun	>40	---	High	High	High.
Udifluvents	B	Frequent	Very brief or brief.	Oct-Jun	2.0-6.0	Apparent	Nov-May	>40	---	Moderate	High	High.
Fr: Fredon	C	None	---	---	0-1.5	Apparent	Oct-Jun	>60	---	High	Low	Low.
HnB, HnC, HnD: Hinckley	A	None	---	---	>6.0	---	---	>60	---	Low	Low	High.

See footnote at end of table.

TABLE 18.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In				
HrF*:												
Hollis	C/D	None	---	---	>6.0	---	---	10-20	Hard	Moderate	Low	High.
Rock outcrop	D	None	---	---	>6.0	---	---	0	Hard	---	---	---
Ip Ipswich	D	Frequent	Very brief	Jan-Dec	+1-0	Apparent	Jan-Dec	>60	---	---	High	High.
KnB, KnC Knickerbocker	A	None	---	---	>6.0	---	---	>60	---	Low	Low	Moderate.
LcA, LcB, LeB Leicester	C	None	---	---	0-1.5	Apparent	Nov-May	>60	---	High	Low	High.
Pa Palms	A/D	None	---	---	+1-1.0	Apparent	Nov-May	>60	---	High	High	Moderate.
Pc*:												
Palms	A/D	None	---	---	+1-1.0	Apparent	Nov-May	>60	---	High	High	Moderate.
Carlisle	A/D	None	---	---	+.5-1.0	Apparent	Sep-Jun	>60	---	High	High	Low.
PnB, PnC, PnD, PoB, PoC, PoD Paxton	C	None	---	---	1.5-2.5	Perched	Feb-Apr	>60	---	Moderate	Low	Moderate.
Pt*, Pv*. Pits												
Pw Pompton	B	Rare	---	---	1.0-2.0	Apparent	Oct-May	>60	---	High	Moderate	High.
Ra Raynham	C	None	---	---	0-2.0	Apparent	Nov-May	>60	---	High	High	Moderate.
RdA, RdB, RgB Ridgebury	C	None	---	---	0-0.5	Perched	Nov-May	>60	---	High	High	High.
RhA, RhB, RhC, RhD, RhE Riverhead	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	High.
SbB, SbC, SbD Stockbridge	C	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.

See footnote at end of table.

TABLE 18.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In				
SgC*:												
Stockbridge	C	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
Rock outcrop	D	None	---	---	>6.0	---	---	0	Hard	---	---	---
Sh, Sm: Sun	D	None	---	---	+1-0.5	Apparent	Nov-Apr	>60	---	High	High	Moderate.
SuA, SuB: Sutton	B	None	---	---	1.5-2.5	Apparent	Nov-Apr	>60	---	High	Moderate	High.
Ub*, Uc*. Udorthents												
UdB: Unadilla	B	None	---	---	>6.0	---	---	>60	---	High	Low	Moderate.
Uf*: Urban land	---	None	---	---	>2.0	---	---	>10	---	---	---	---
UhB*, UhC*, UhD*:												
Urban land	---	None	---	---	>2.0	---	---	>10	---	---	---	---
Charlton	B	None	---	---	>6.0	---	---	>60	---	Low	Low	High.
UlC*, UlD*:												
Urban land	---	None	---	---	>2.0	---	---	>10	---	---	---	---
Charlton	B	None	---	---	>6.0	---	---	>60	---	Low	Low	High.
Chatfield	B	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Low	Moderate.
UmC*:												
Urban land	---	None	---	---	>2.0	---	---	>10	---	---	---	---
Chatfield	B	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Low	Moderate.
Rock outcrop	D	None	---	---	>6.0	---	---	0	Hard	---	---	---
UpB*, UpC*, UpD*:												
Urban land	---	None	---	---	>2.0	---	---	>10	---	---	---	---
Paxton	C	None	---	---	1.5-2.5	Perched	Feb-Apr	>60	---	Moderate	Low	Moderate.

See footnote at end of table.

TABLE 18.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In				
UrB*:												
Urban land	---	None	---	---	>2.0	---	---	>10	---	---	---	---
Ridgebury	C	None	---	---	0-0.5	Perched	Nov-May	>60	---	High	High	High.
UvB*, UvC*:												
Urban land	---	None	---	---	>2.0	---	---	>10	---	---	---	---
Riverhead	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	High.
UwB*:												
Urban land	---	None	---	---	>2.0	---	---	>10	---	---	---	---
Woodbridge	C	None	---	---	1.5-2.5	Perched	Nov-May	>60	---	High	Low	Moderate.
WdA, WdB, WdC Woodbridge	C	None	---	---	1.5-2.5	Perched	Nov-May	>60	---	High	Low	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 19.--RELATIONSHIP BETWEEN PARENT MATERIAL, LANDSCAPE POSITION, AND DRAINAGE CLASS OF THE SOILS

Soil characteristics and parent material	Excessively drained	Somewhat excessively drained	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained	Very poorly drained
	SOILS ON UPLAND TILL PLAINS						
Very deep, medium textured and moderately coarse textured soils that formed in yellowish brown glacial till derived from gneiss, schist, or granite and that have a dense substratum			Paxton	Woodbridge	Ridgebury	Ridgebury	
Very deep, medium textured and moderately coarse textured soils that formed in yellowish brown glacial till derived from gneiss, granite, or schist			Charlton	Sutton	Leicester	Leicester	
Very deep, medium textured and moderately coarse textured soils that formed in yellowish brown glacial till derived from limestone, marble, or schist and that have a high base saturation			Stockbridge			Sun	Sun
Moderately deep, medium textured soils that formed in yellowish brown glacial till derived from gneiss, schist, or granite and that are underlain by folded bedrock at a depth of 20 to 40 inches		Chatfield	Chatfield				
Shallow, moderately coarse textured soils that formed in yellowish brown glacial till over highly fractured, folded gneiss, granite, or schist at a depth of 10 to 20 inches		Hollis	Hollis				
	SOILS ON OUTWASH TERRACES						
Very deep, coarse textured soils that formed in water-sorted sand and gravel derived from acid crystalline rocks	Hinckley						
Very deep, medium textured and moderately coarse textured soils that formed in water-sorted sand over stratified sand and gravel			Riverhead	Pompton	Pompton Fredon	Fredon	
Very deep, moderately coarse textured soils that formed in water-sorted deposits derived from acid crystalline rocks		Knickerbocker					
	SOILS ON GLACIOLACUSTRINE PLAINS AND TERRACES						
Very deep, medium textured soils that formed in medium textured glaciolacustrine sediments			Unadilla			Raynham	

TABLE 19.--RELATIONSHIP BETWEEN PARENT MATERIAL, LANDSCAPE POSITION, AND DRAINAGE CLASS OF THE SOILS--Continued

Soil characteristics and parent material	Excessively drained	Somewhat excessively drained	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained	Very poorly drained
	SOILS IN SWAMPS AND BOGS						
Very deep soils that formed in well decomposed organic matter and that are subject to daily tidal flooding							Ipswich
Very deep soils that formed in 16 to 51 inches of well decomposed organic matter over loamy sediments							Palms
Very deep soils that formed in more than 51 inches of well decomposed organic matter							Carlisle
	SOILS ON FLOOD PLAINS						
Very deep soils that formed in moderately fine textured to coarse textured alluvial sediments			Udifluvents	Udifluvents	Fluvaquents	Fluvaquents	Fluvaquents

TABLE 20.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Carlisle	Euic, mesic Typic Medisaprists
Charlton	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Chatfield	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Fluvaquents	Fluvaquents
Fredon	Coarse-loamy over sandy or sandy-skeletal, mixed, nonacid, mesic Aeric Haplaquepts
Hinckley	Sandy-skeletal, mixed, mesic Typic Udorthents
Hollis	Loamy, mixed, mesic Lithic Dystrochrepts
Ipswich	Euic, mesic Typic Sulfihemists
Knickerbocker	Sandy, mixed, mesic Typic Dystrochrepts
Leicester	Coarse-loamy, mixed, acid, mesic Aeric Haplaquepts
Palms	Loamy, mixed, euic, mesic Terric Medisaprists
Paxton	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Pompton	Coarse-loamy, mixed, mesic Aquic Dystrochrepts
Raynham	Coarse-silty, mixed, nonacid, mesic Aeric Haplaquepts
Ridgebury	Coarse-loamy, mixed, nonacid, mesic Aeric Haplaquepts
Riverhead	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Stockbridge	Coarse-loamy, mixed, mesic Dystric Eutrochrepts
Sun	Coarse-loamy, mixed, nonacid, mesic Aeric Haplaquepts
Sutton	Coarse-loamy, mixed, mesic Aquic Dystrochrepts
Udifluvents	Udifluvents
Udorthents	Udorthents
Unadilla	Coarse-silty, mixed, mesic Typic Dystrochrepts
Woodbridge	Coarse-loamy, mixed, mesic Aquic Dystrochrepts

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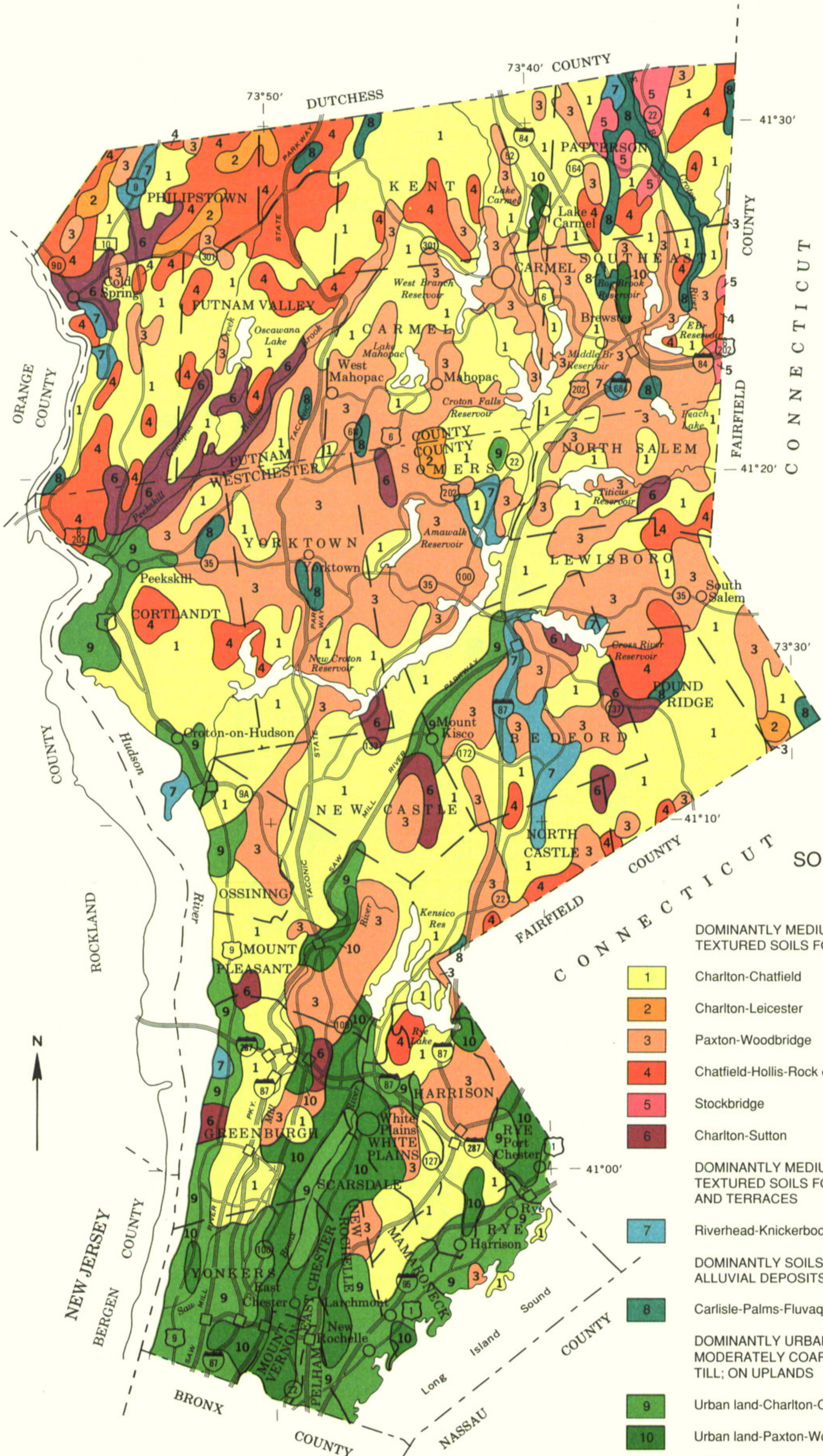


SOIL LEGEND*

DOMINANTLY MEDIUM TEXTURED AND MODERATELY COARSE TEXTURED SOILS FORMED IN GLACIAL TILL; ON UPLANDS

- 1 Charlton-Chatfield
- 2 Charlton-Leicester
- 3 Paxton-Woodbridge
- 4 Chatfield-Hollis-Rock outcrop
- 5 Stockbridge
- 6 Charlton-Sutton

DOMINANTLY MEDIUM TEXTURED AND MODERATELY COARSE TEXTURED SOILS FORMED IN GLACIAL OUTWASH; ON PLAINS AND TERRACES

- 7 Riverhead-Knickerbocker

DOMINANTLY SOILS FORMED IN ORGANIC MATERIAL AND ALLUVIAL DEPOSITS; ON LOWLANDS AND ALONG STREAMS

- 8 Carlisle-Palms-Fluvaquents

DOMINANTLY URBAN LAND AND MEDIUM TEXTURED AND MODERATELY COARSE TEXTURED SOILS FORMED IN GLACIAL TILL; ON UPLANDS

- 9 Urban land-Charlton-Chatfield
- 10 Urban land-Paxton-Woodbridge

* The units on this legend are described in the text under the heading "General Soil Map Units."

Compiled 1993

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
CORNELL UNIVERSITY AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

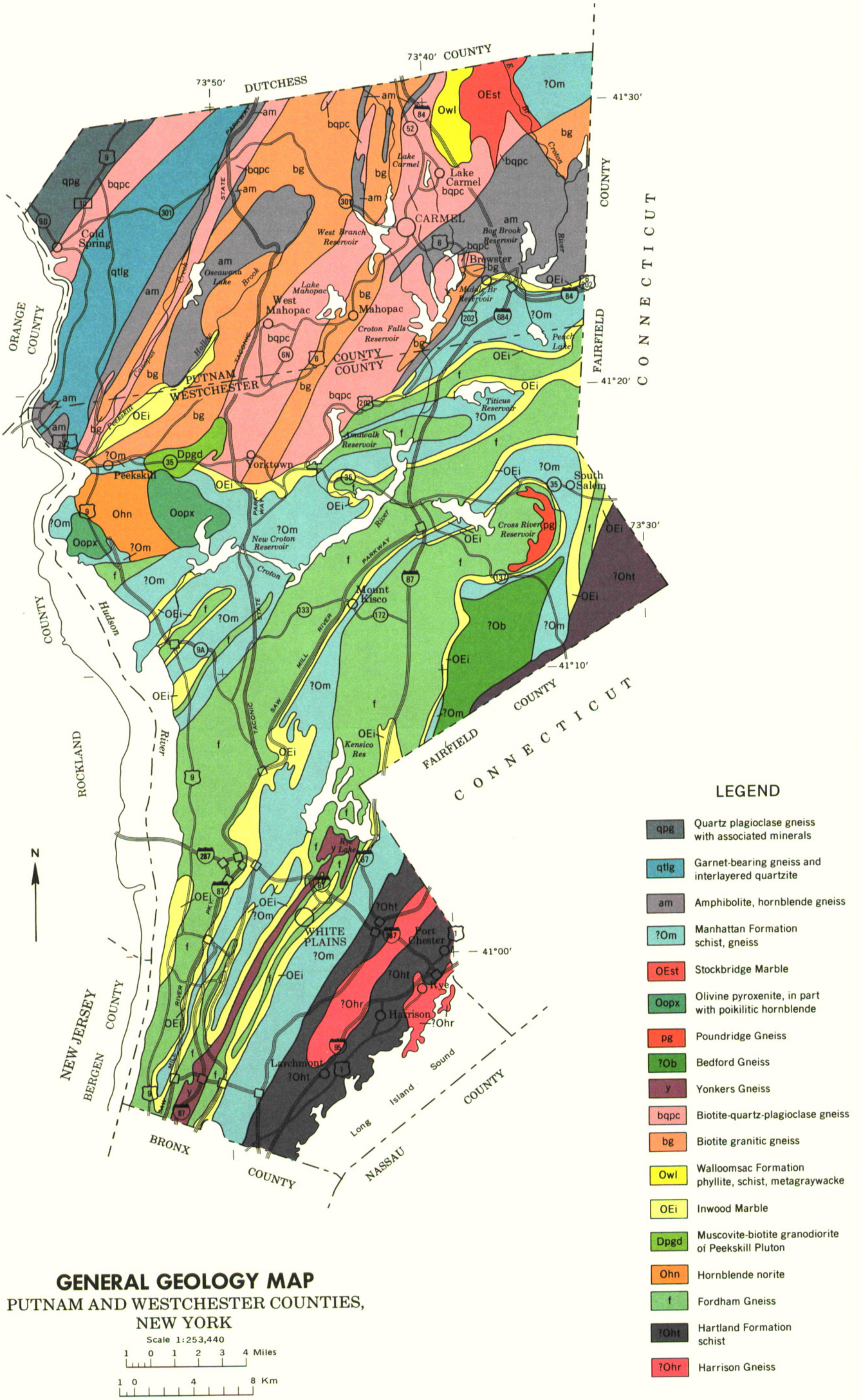
PUTNAM AND WESTCHESTER COUNTIES, NEW YORK

Scale 1:253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

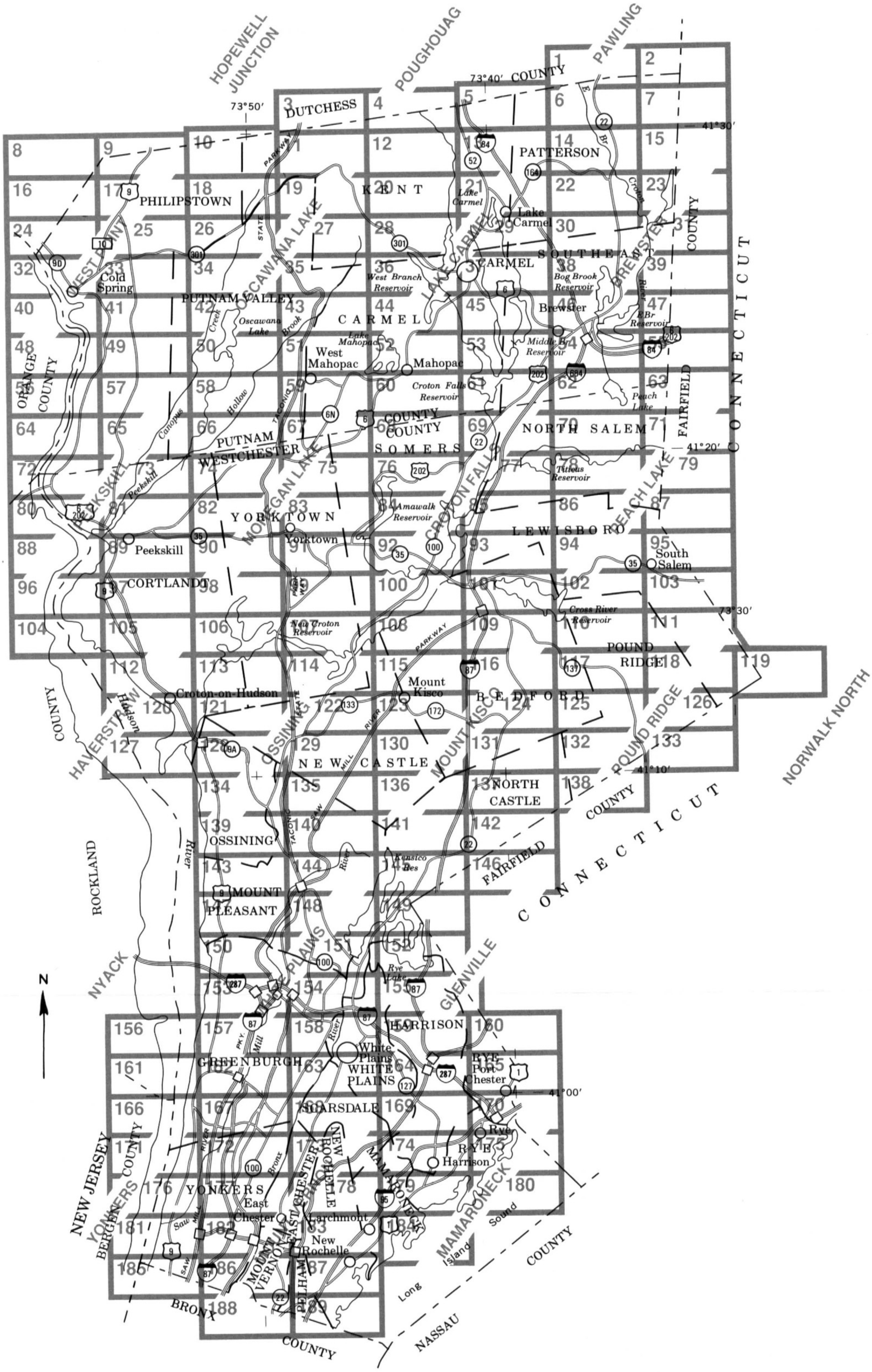


GENERAL GEOLOGY MAP
PUTNAM AND WESTCHESTER COUNTIES,
NEW YORK

Scale 1:253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km



INDEX TO MAP SHEETS

PUTNAM AND WESTCHESTER COUNTIES,
NEW YORK

Scale 1:253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km

SOIL LEGEND

Publication symbols consist of letters or a combination of letter (e.g., Ce, HnD or PnC). The first letter, always a capital is the initial letter of the soil name. The second letter is lower case and separates map units, except those that are slope phases, having names that begin with the same letter. The third letter, always a capital A, B, C, D, E, or F, indicates the slope. Symbols without a slope letter are for nearly level soils, soils with considerable range in slope that are named at categories above the series, or for miscellaneous areas.

SYMBOL	NAME
Ce	Carlisle muck
ChB	Charlton loam, 2 to 8 percent slopes
ChC	Charlton loam, 8 to 15 percent slopes
ChD	Charlton loam, 15 to 25 percent slopes
ChE	Charlton loam, 25 to 35 percent slopes
ClB	Charlton loam, 2 to 8 percent slopes, very stony
ClC	Charlton loam, 8 to 15 percent slopes, very stony
ClD	Charlton loam, 15 to 25 percent slopes, very stony
ClE	Charlton loam, 25 to 35 percent slopes, very stony
ClF	Charlton loam, 35 to 45 percent slopes, very stony
CrC	Charlton-Chatfield complex, rolling, very rocky
CsD	Chatfield-Charlton complex, hilly, very rocky
CtC	Chatfield-Hollis-Rock outcrop complex, rolling
CuD	Chatfield-Hollis-Rock outcrop complex, hilly
Ff	Fluvaquents-Udifluvents complex, frequently flooded
Fr	Fredon silt loam
HnB	Hinckley gravelly loamy, sand, 3 to 8 percent slopes
HnC	Hinckley gravelly loamy sand, 8 to 15 percent slopes
HnD	Hinckley gravelly loamy sand, 15 to 25 percent slopes
HrF	Hollis-Rock outcrop complex, very steep
Ip	Ipswich mucky peat
KnB	Knickerbocker fine sandy loam, 2 to 8 percent slopes
KnC	Knickerbocker fine sandy loam, 8 to 15 percent slopes
LcA	Leicester loam, 0 to 3 percent slopes, stony
LcB	Leicester loam, 3 to 8 percent slopes, stony
LeB	Leicester loam, 2 to 8 percent slopes, very stony
Pa	Palms muck
Pc	Palms and Carlisle soils, ponded
PnB	Paxton fine sandy loam, 2 to 8 percent slopes
PnC	Paxton fine sandy loam, 8 to 15 percent slopes
PnD	Paxton fine sandy loam, 15 to 25 percent slopes
PoB	Paxton fine sandy loam, 2 to 8 percent slopes, very stony
PoC	Paxton fine sandy loam, 8 to 15 percent slopes, very stony
PoD	Paxton fine sandy loam, 15 to 25 percent slopes, very stony
Pt	Pits, gravel
Pv	Pits, quarry
Pw	Pompton silt loam, loamy substratum
Ra	Raynham silt loam
RdA	Ridgebury loam, 0 to 3 percent slopes
RdB	Ridgebury loam, 3 to 8 percent slopes
RgB	Ridgebury loam, 2 to 8 percent slopes, very stony
RhA	Riverhead loam, 0 to 3 percent slopes
RhB	Riverhead loam, 3 to 8 percent slopes
RhC	Riverhead loam, 8 to 15 percent slopes
RhD	Riverhead loam, 15 to 25 percent slopes
RhE	Riverhead loam, 25 to 50 percent slopes
SbB	Stockbridge silt loam, 2 to 8 percent slopes
SbC	Stockbridge silt loam, 8 to 15 percent slopes
SbD	Stockbridge silt loam, 15 to 25 percent slopes
SgC	Stockbridge-Rock outcrop complex, rolling
Sh	Sun loam
Sm	Sun loam, extremely stony
SuA	Sutton loam, 0 to 3 percent slopes
SuB	Sutton loam, 3 to 8 percent slopes
Ub	Udorthents, smoothed
Uc	Udorthents, wet substratum
UdB	Unadilla silt loam, 2 to 6 percent slopes
Uf	Urban land
UhB	Urban land-Charlton complex, 2 to 8 percent slopes
UhC	Urban land-Charlton complex, 8 to 15 percent slopes
UhD	Urban land-Charlton complex, 15 to 25 percent slopes
UlC	Urban land-Charlton-Chatfield complex, rolling, very rocky
UlD	Urban land-Charlton-Chatfield complex, hilly, very rocky
UmC	Urban land-Chatfield-Rock outcrop complex, rolling
UpB	Urban land-Paxton complex, 2 to 8 percent slopes
UpC	Urban land-Paxton complex, 8 to 15 percent slopes
UpD	Urban land-Paxton complex, 15 to 25 percent slopes
UrB	Urban land-Ridgebury complex, 1 to 8 percent slopes
UvB	Urban land-Riverhead complex, 2 to 8 percent slopes
UvC	Urban land-Riverhead complex, 8 to 15 percent slopes
UwB	Urban land-Woodbridge complex, 2 to 8 percent slopes
WdA	Woodbridge loam, 0 to 3 percent slopes
WdB	Woodbridge loam, 3 to 8 percent slopes
WdC	Woodbridge loam, 8 to 15 percent slopes
W	Water

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state, or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline and neatline

AD HOC BOUNDARY (label) — Davis Airstrip

- Small airport, airfield, park, oilfield, cemetery, or flood pool — FLOOD POOL LINE

STATE COORDINATE TICK
1 890 000 FEET

LAND DIVISION CORNER
(sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate — 66
- Federal — 287
- State — 52
- County, farm or ranch — 1283

RAILROAD

POWER TRANSMISSION LINE
(normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or Small — water

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban area)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — Gas
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water, w
- Intermittent — int, i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — Ce RhD

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE (normally not shown)

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Areas of Muck 1/4 to 2 acres in size

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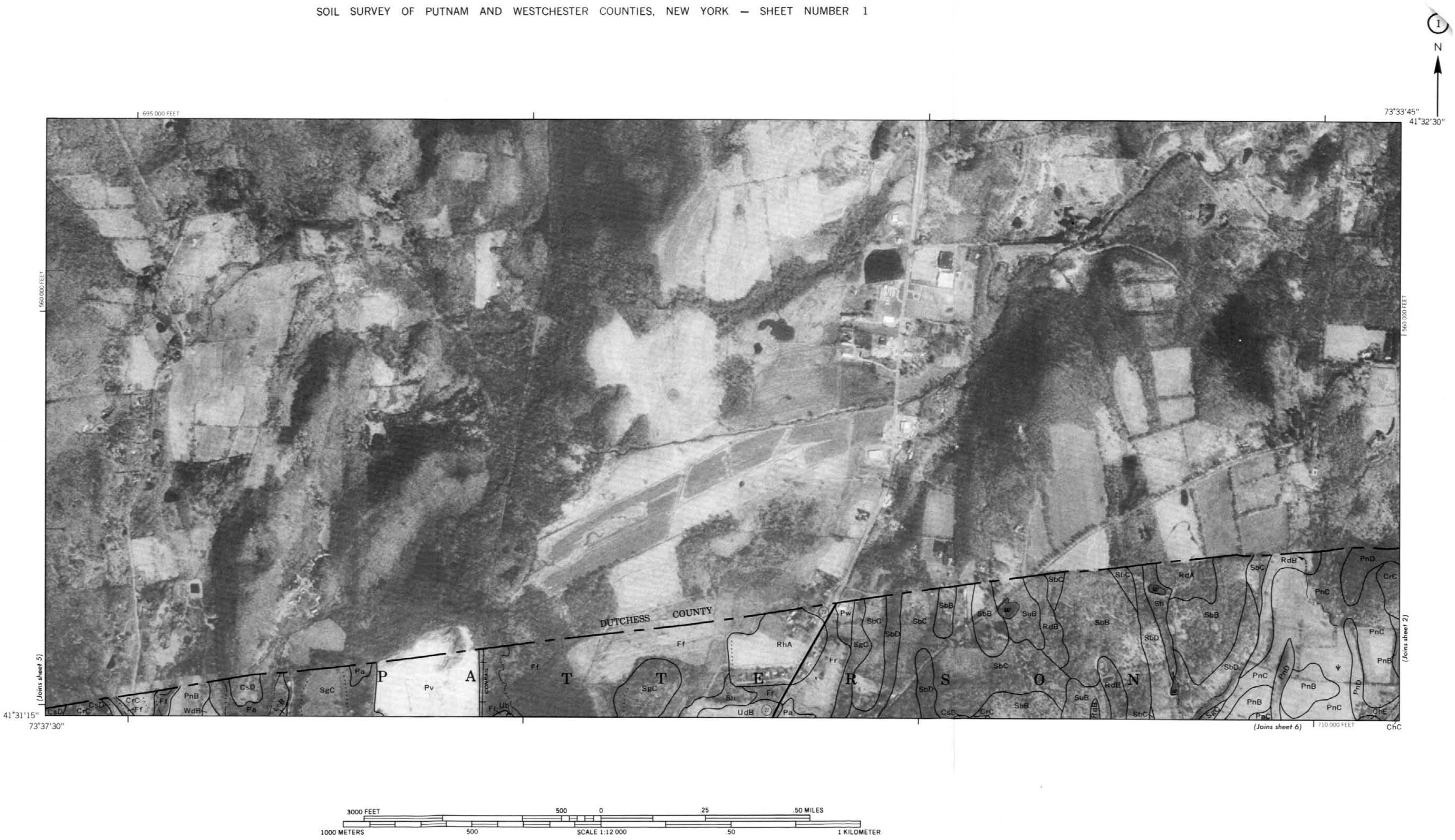
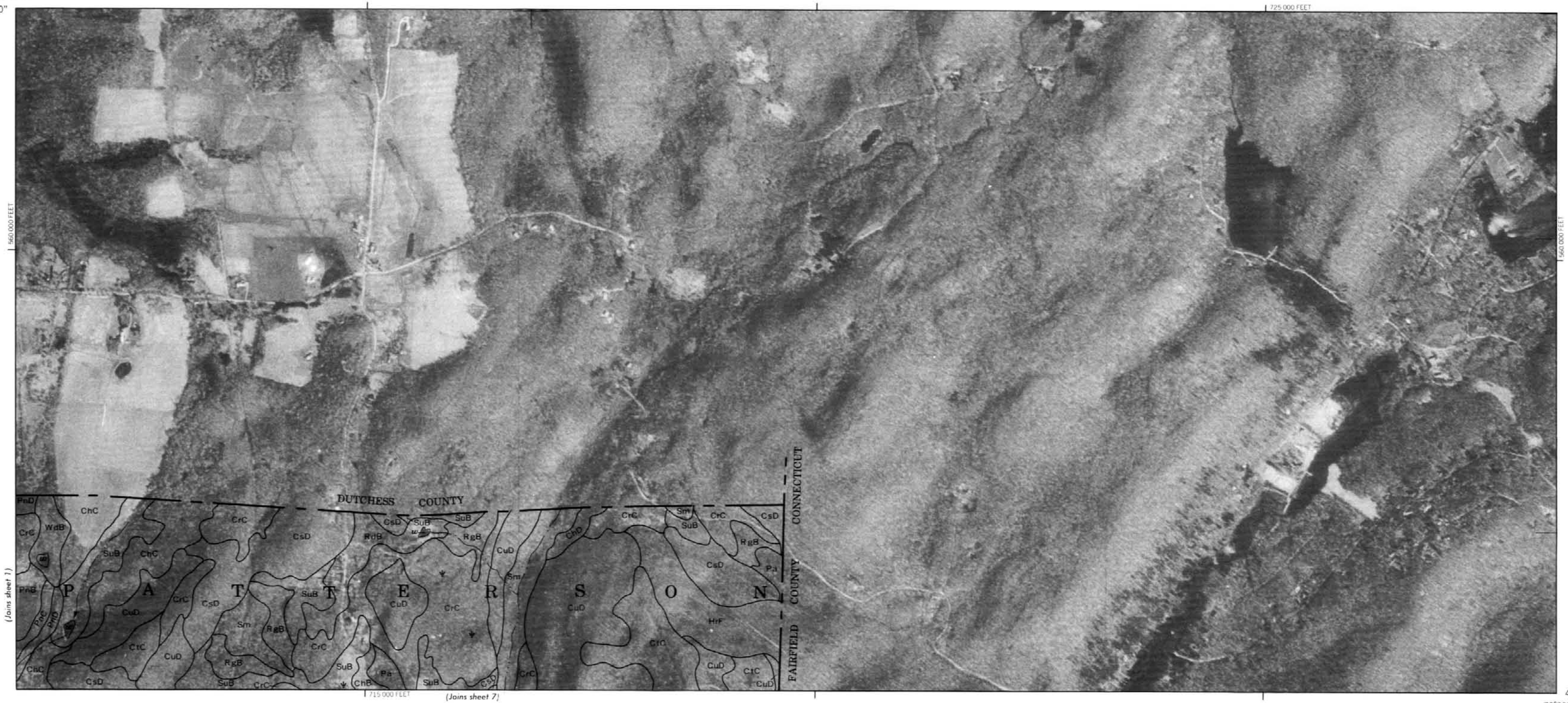
Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.
PUTNAM & WESTCHESTER COS., NEW YORK NO. 1



2

N

73°33'45"
41°32'30"



41°31'15"
73°30'

3000 FEET 500 0 25 50 MILES
1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 2

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3

N

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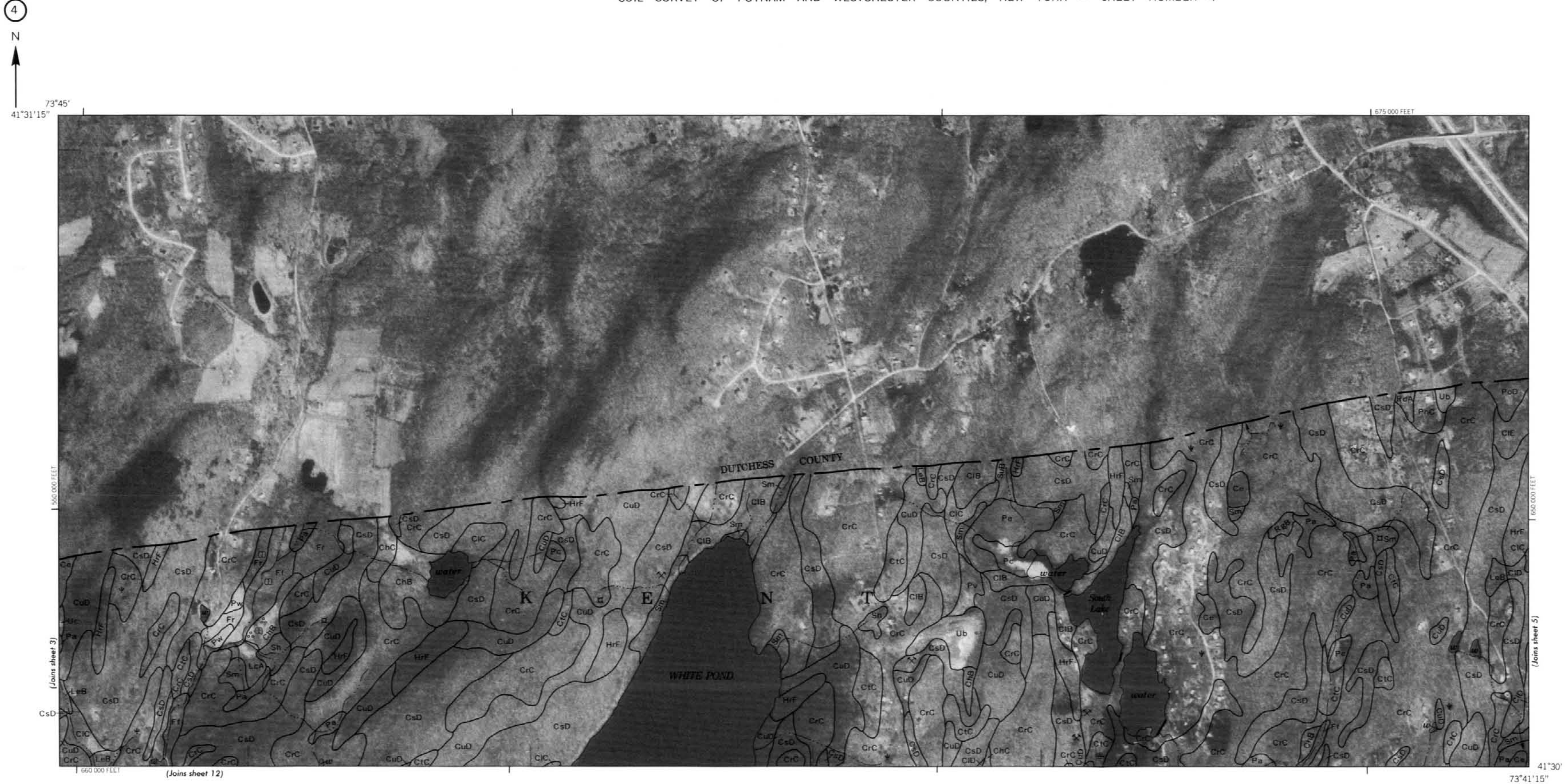
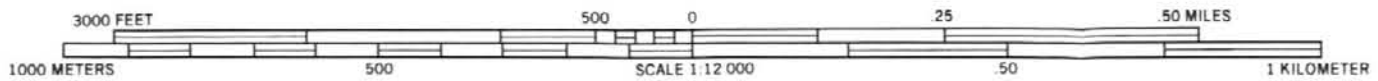
photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 3

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER



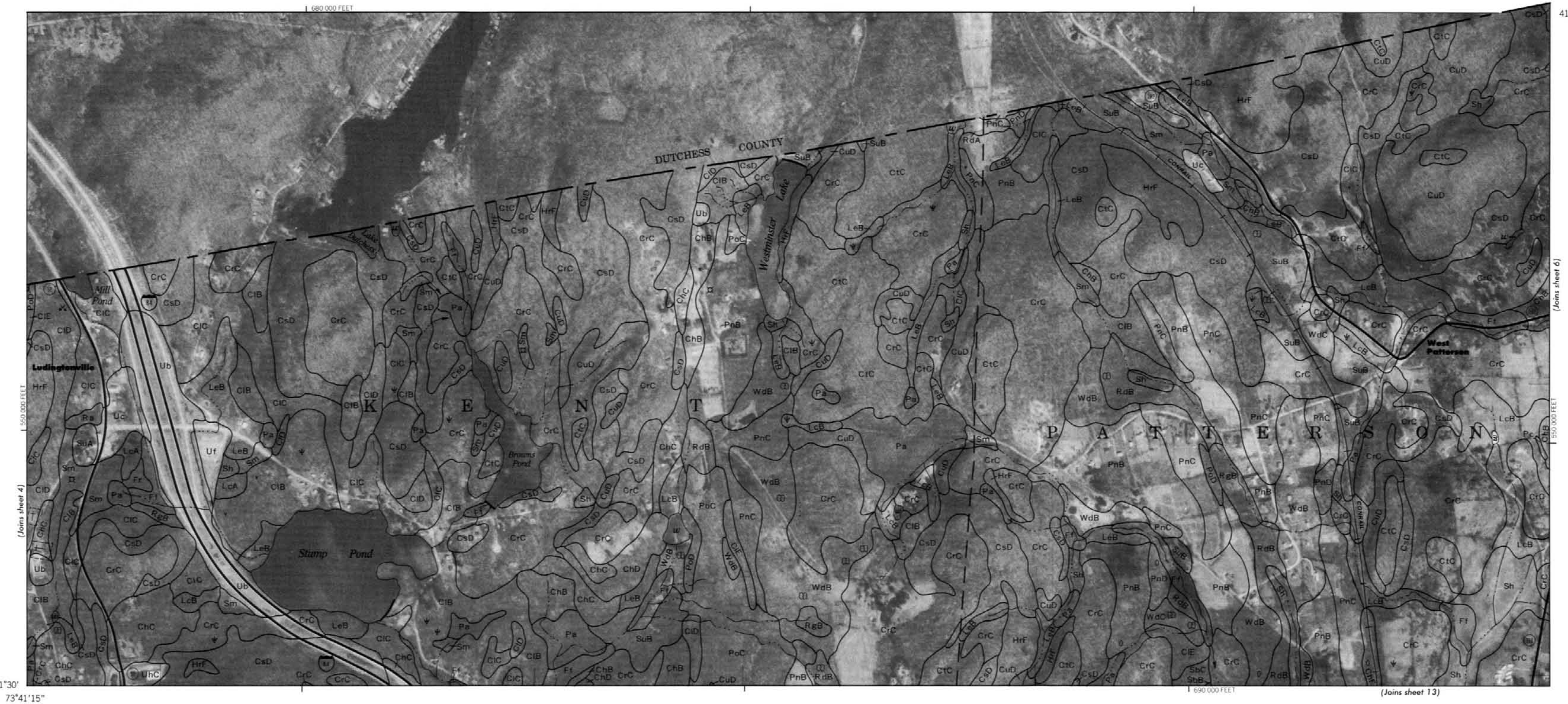


PUTNAM & WESTCHESTER COS., NEW YORK NO. 4

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5

N



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 5

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 6

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

7

N

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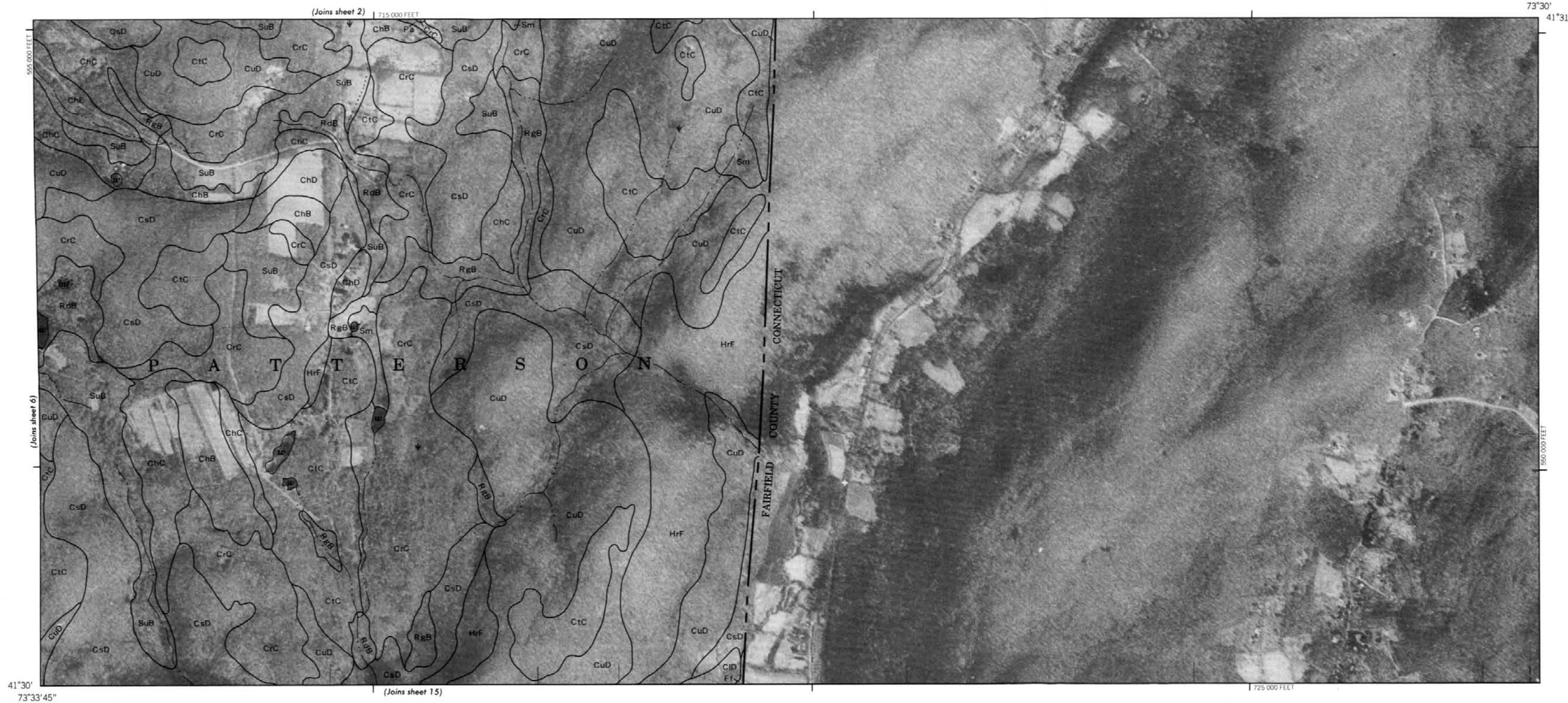
PUTNAM & WESTCHESTER COS., NEW YORK NO. 7



3000 FEET 500 0 25 50 MILES

1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

SOIL SURVEY OF PUTNAM AND WESTCHESTER COUNTIES, NEW YORK — SHEET NUMBER 8

N

74°00'
41°30'

(Joins sheet 9)

(Joins sheet 16)

41°28'45"
73°56'15"

3000 FEET 500 0 25 50 MILES
1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 8

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

9

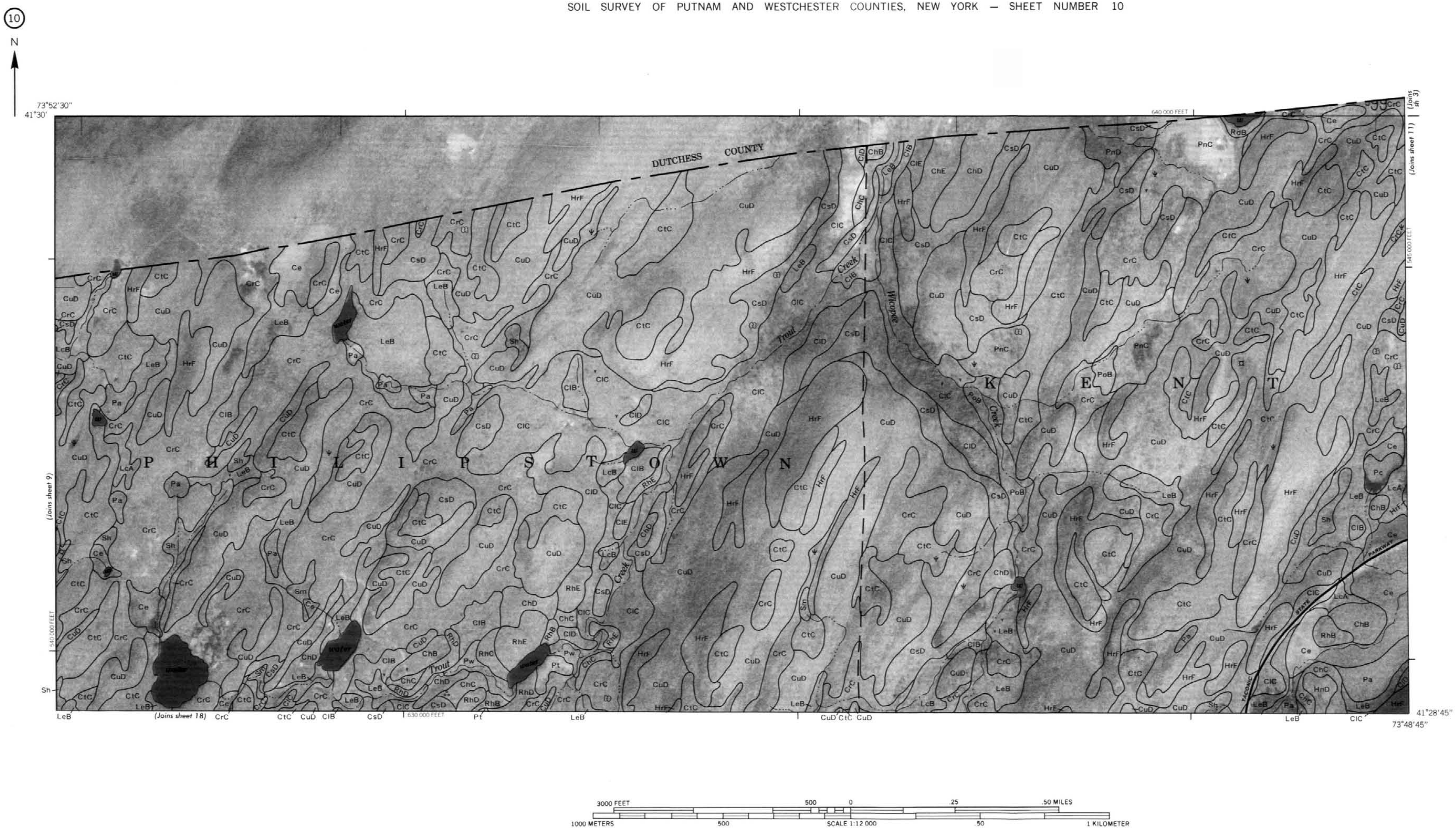
N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 9

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER



PUTNAM & WESTCHESTER COS., NEW YORK NO. 10

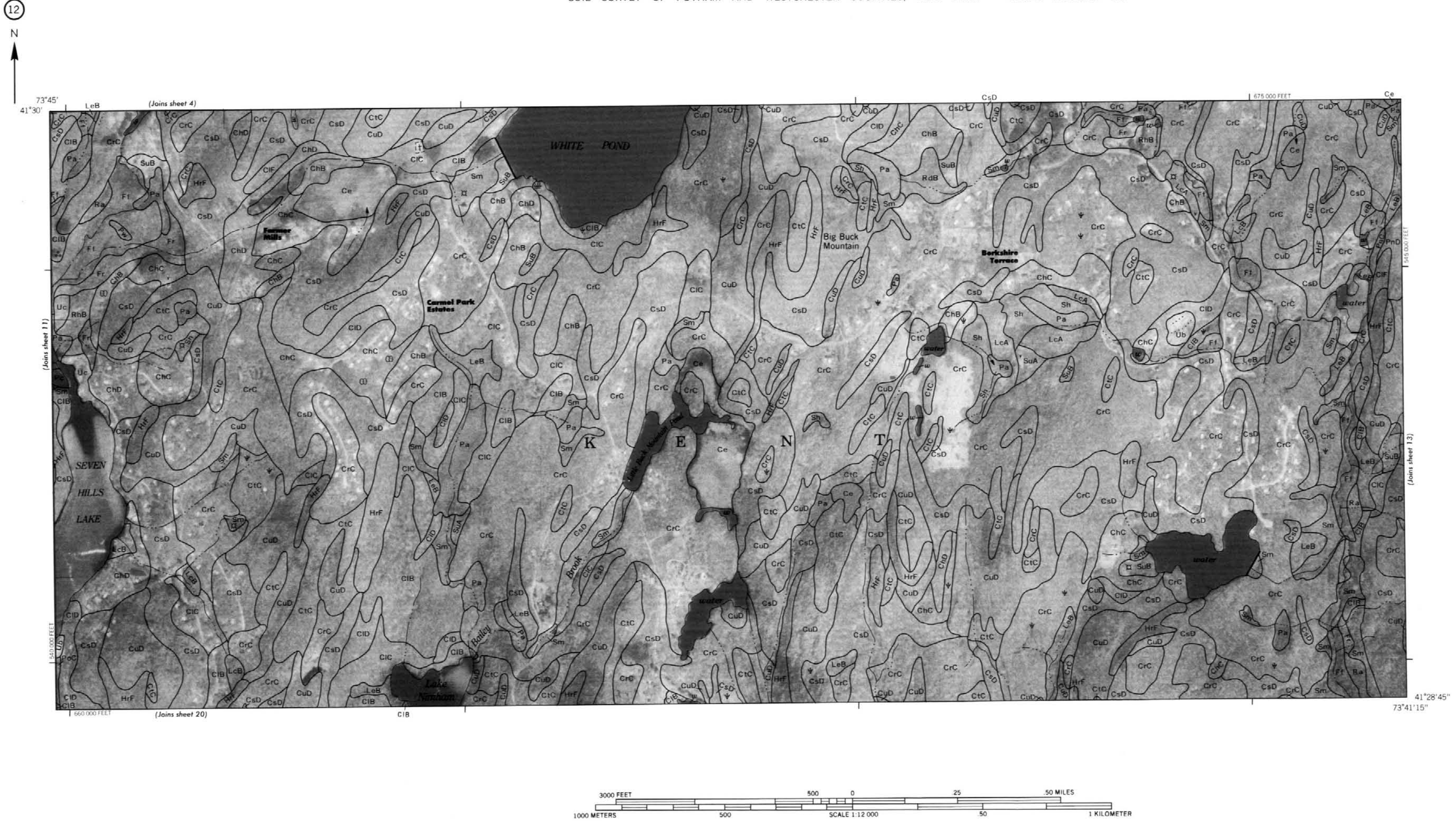
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 11

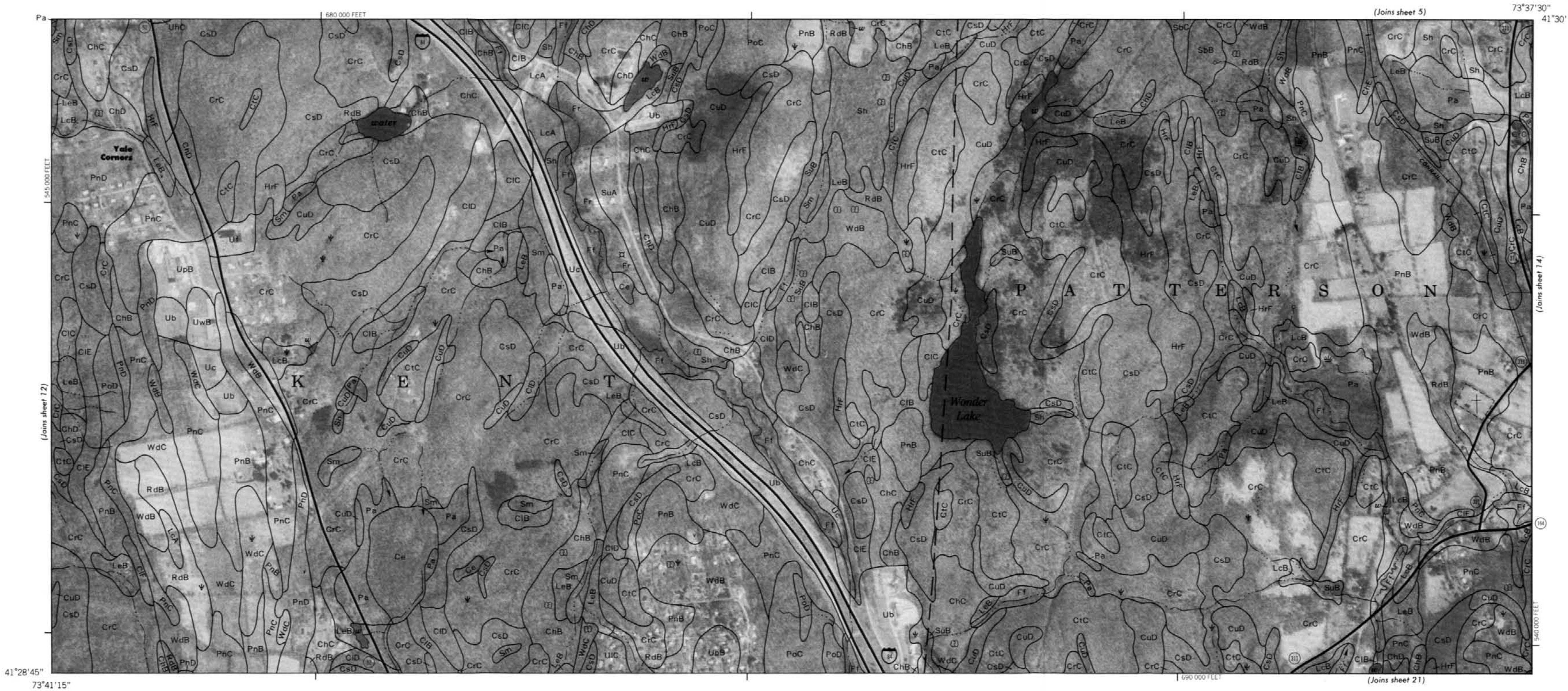


PUTNAM & WESTCHESTER COS., NEW YORK NO. 12

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

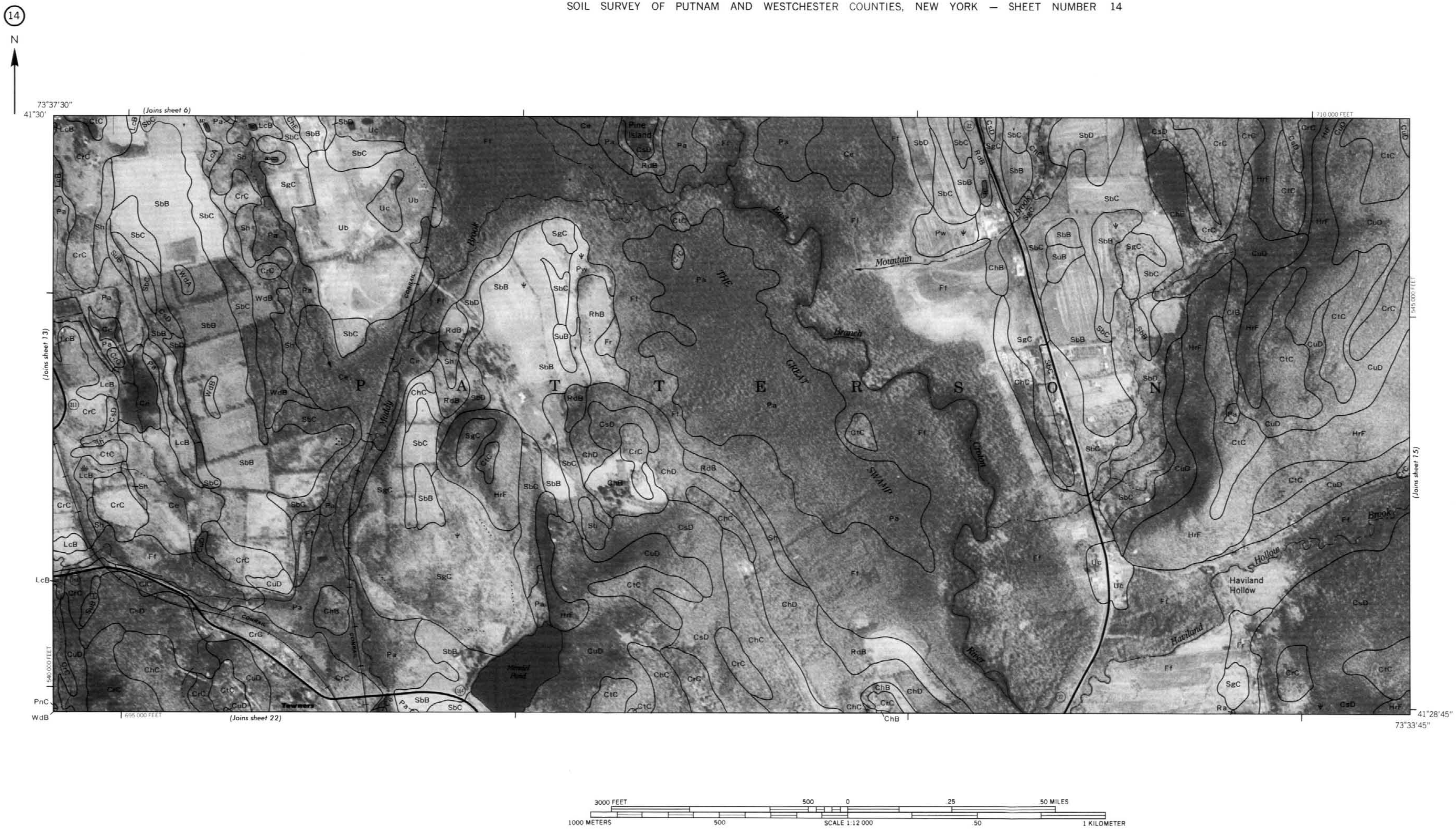
13

N



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 13



PUTNAM & WESTCHESTER COS., NEW YORK NO. 14

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

15

N

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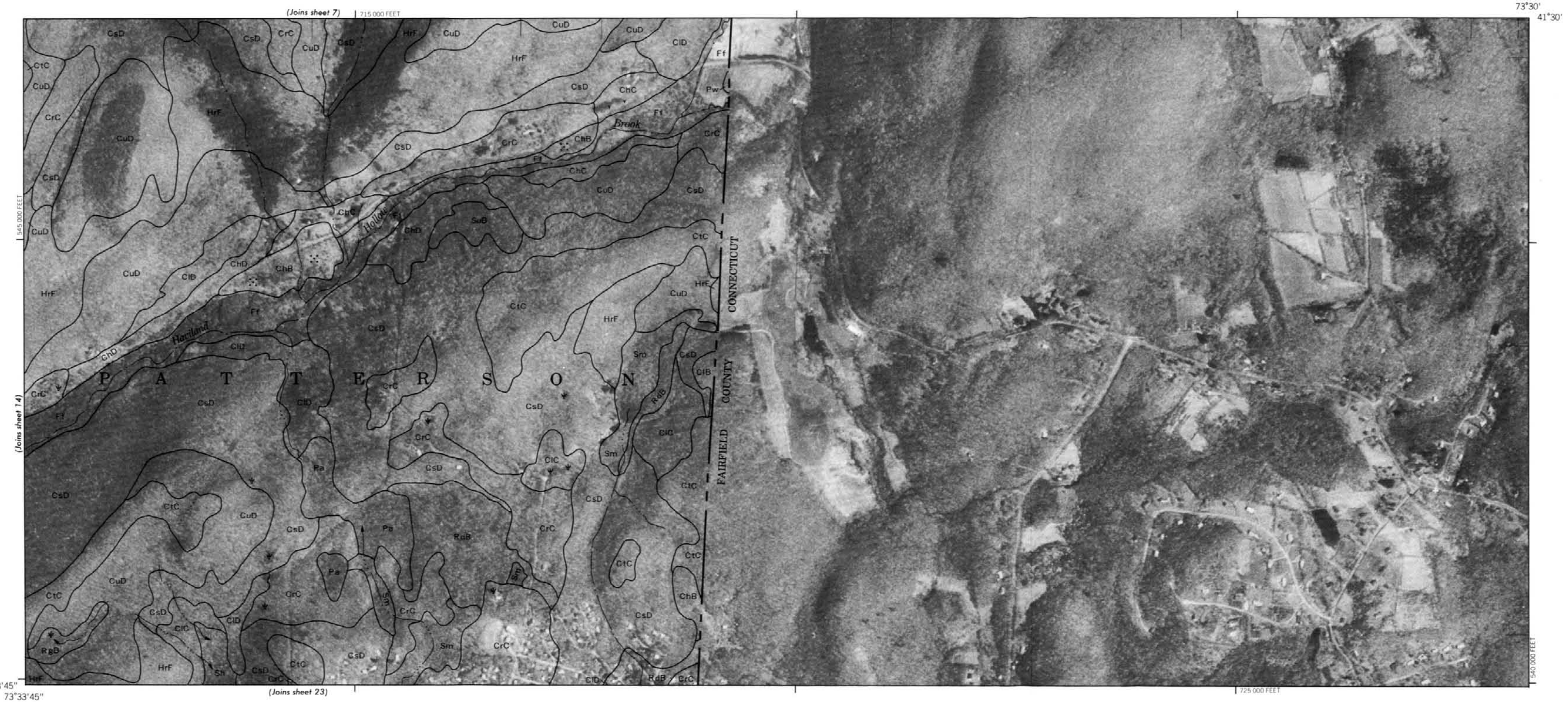
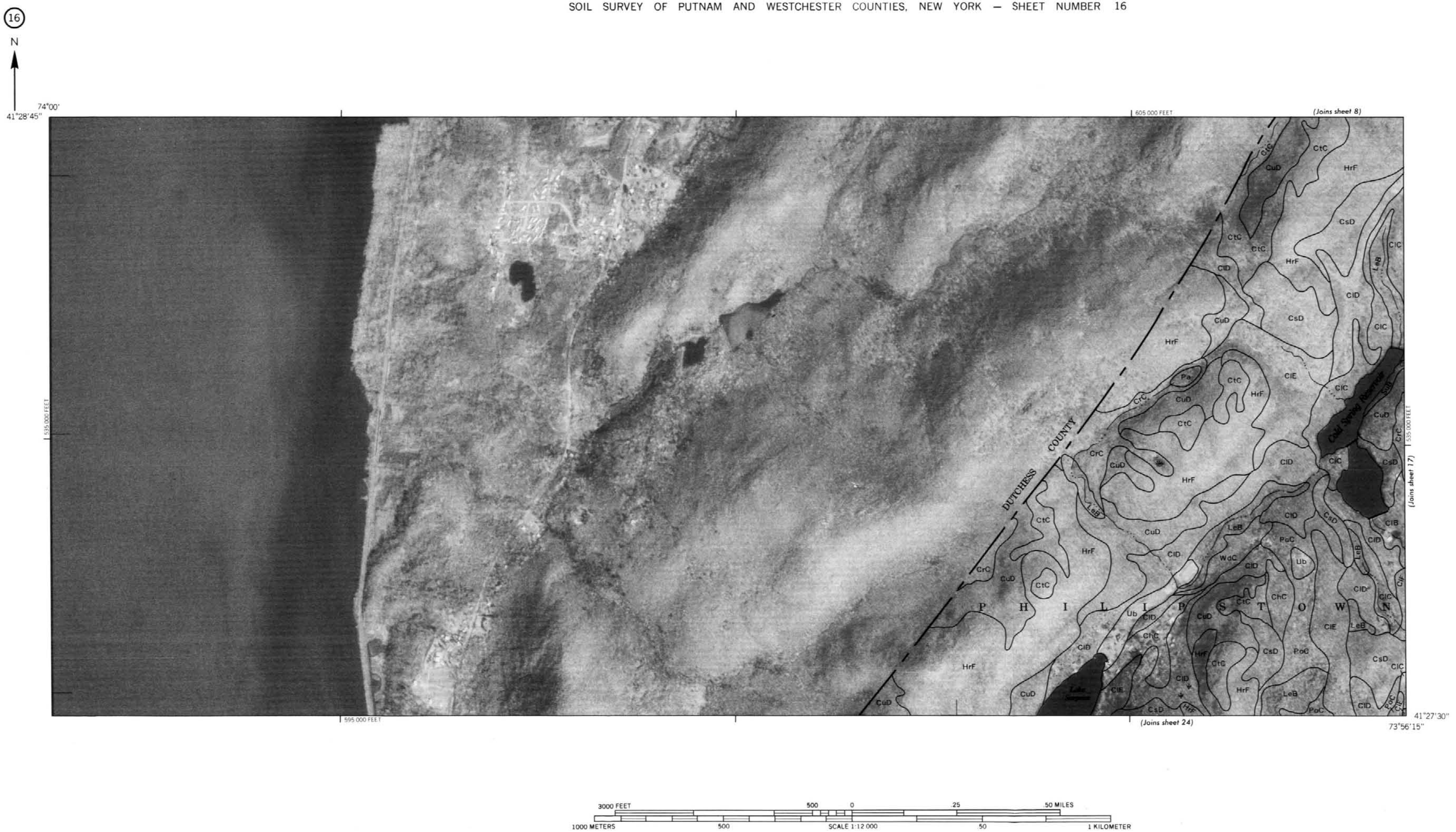
Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 15





PUTNAM & WESTCHESTER COS., NEW YORK NO. 16

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

17

N

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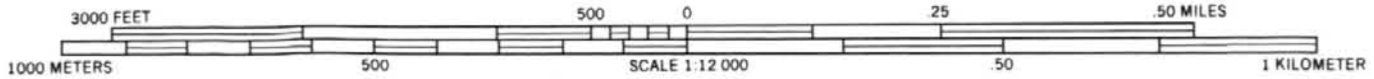
PUTNAM & WESTCHESTER COS., NEW YORK NO. 17



3000 FEET 500 0 25 .50 MILES

1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 18

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

19

N

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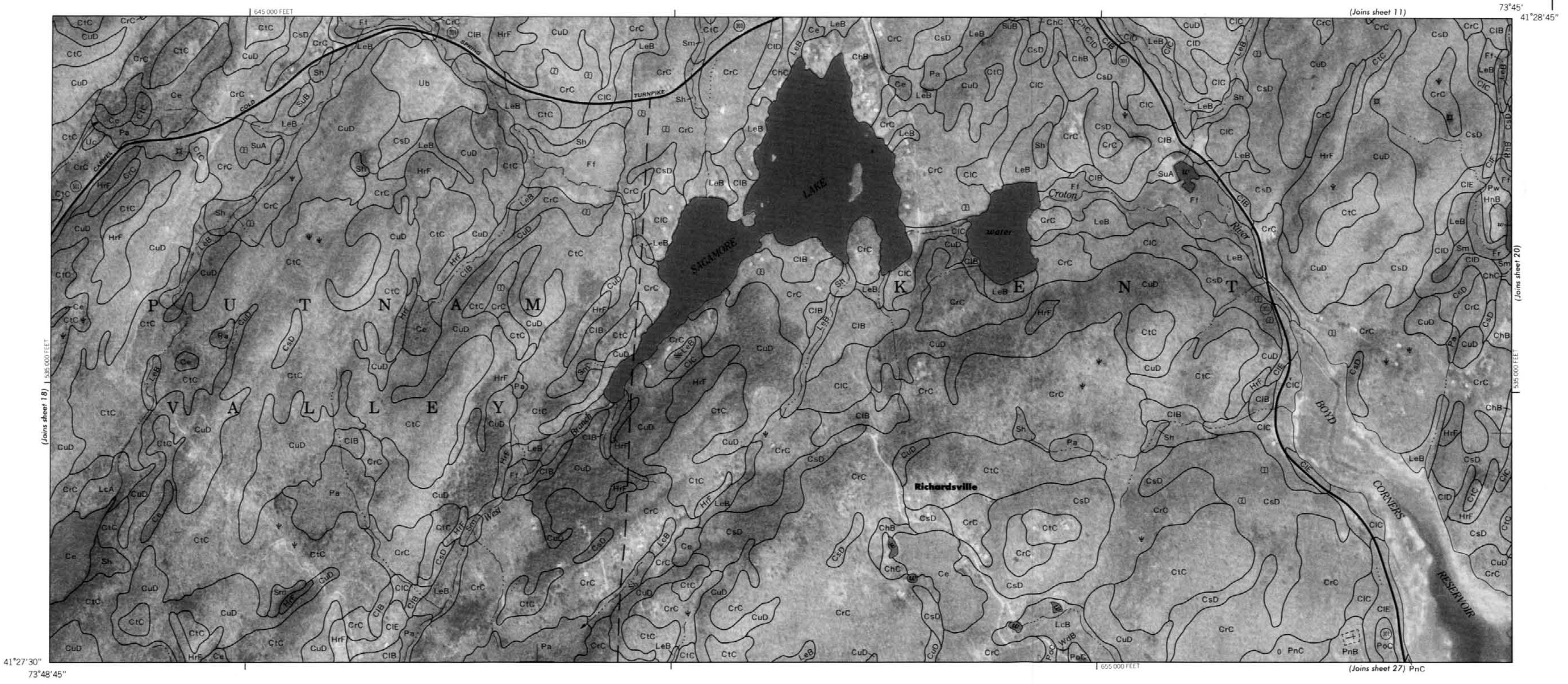
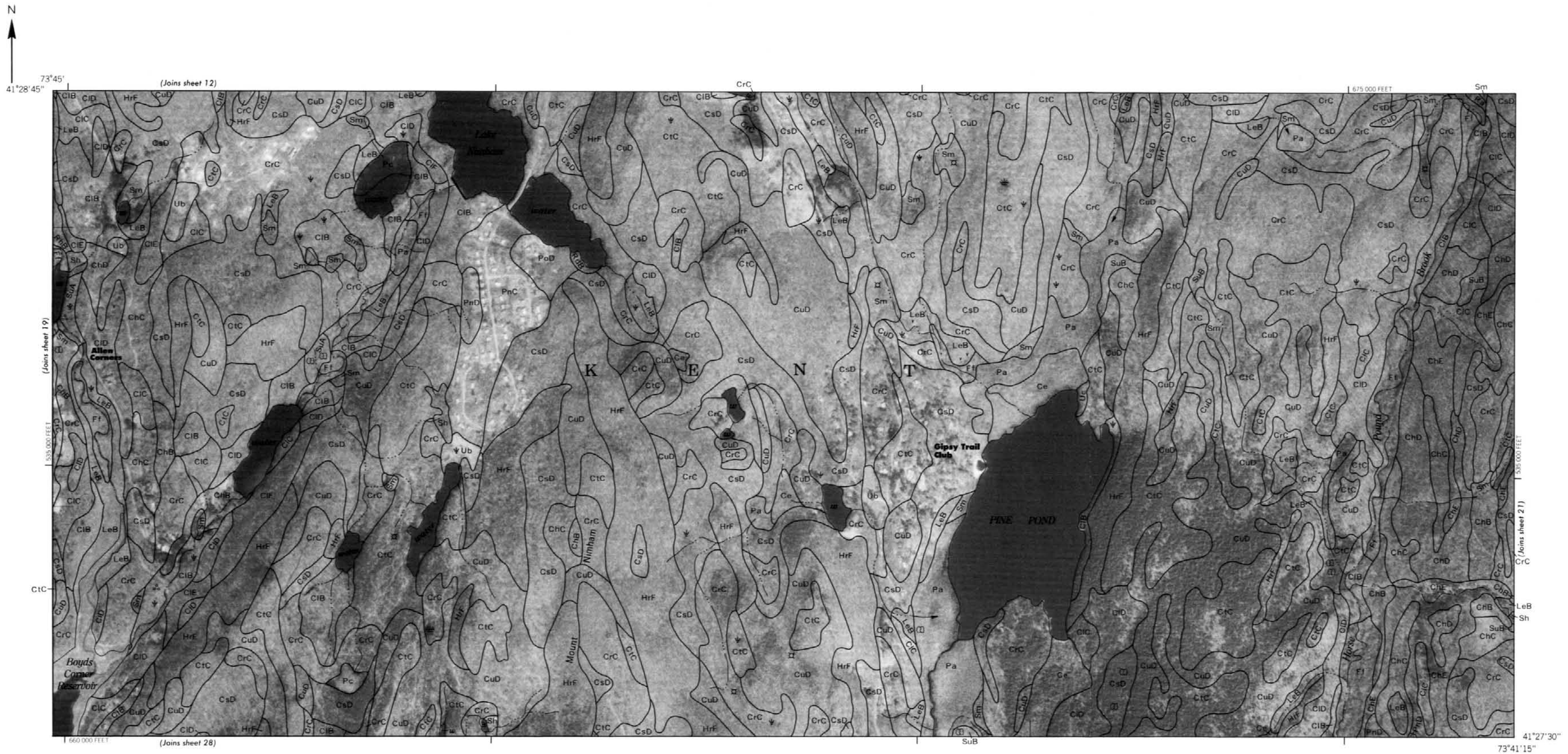
PUTNAM & WESTCHESTER COS., NEW YORK NO. 19



3000 FEET 500 0 25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

20



3000 FEET | 500 | 0 | .25 | .50 MILES

1000 METERS | 500 | SCALE 1:12 000 | .50 | 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 20

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

21

N

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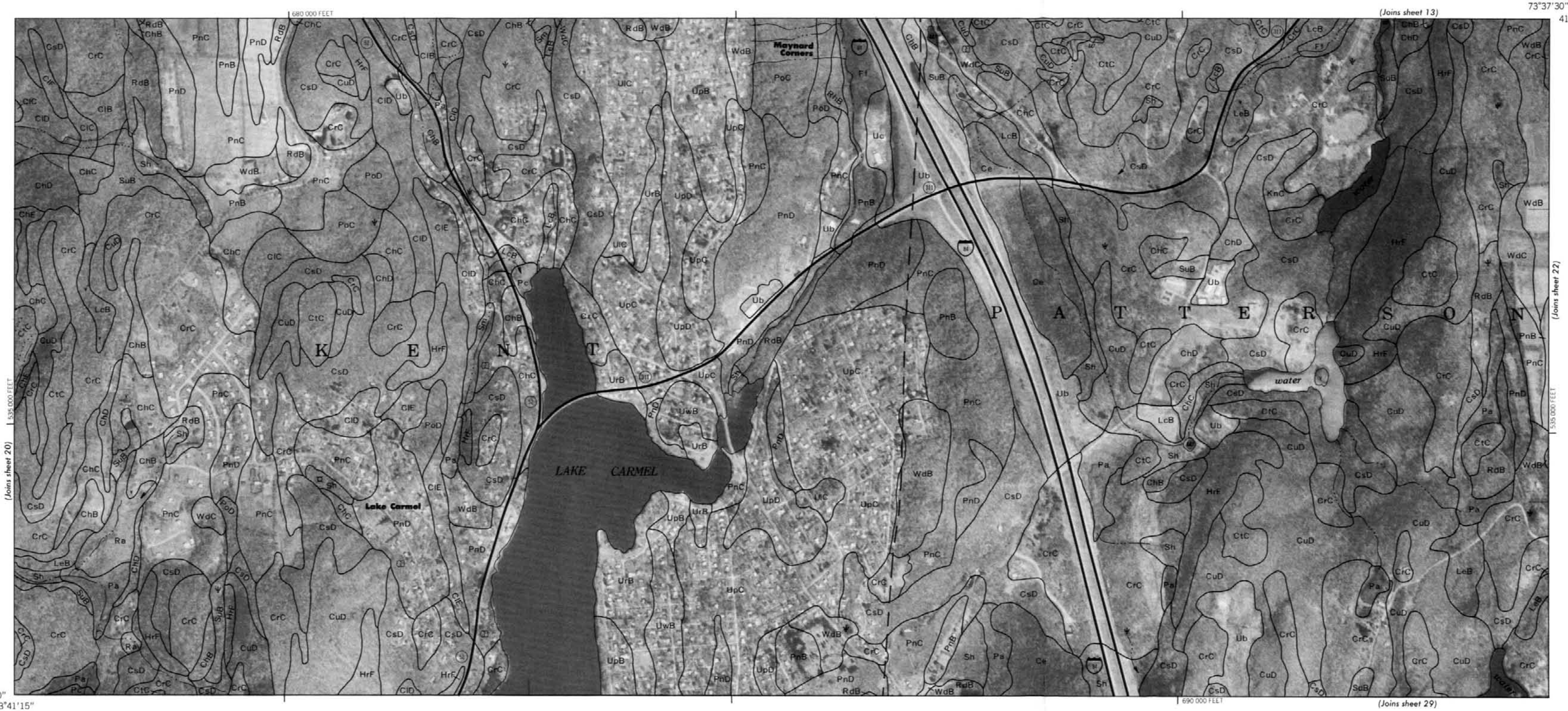
PUTNAM & WESTCHESTER COS., NEW YORK NO. 21



3000 FEET 500 0 25 50 MILES

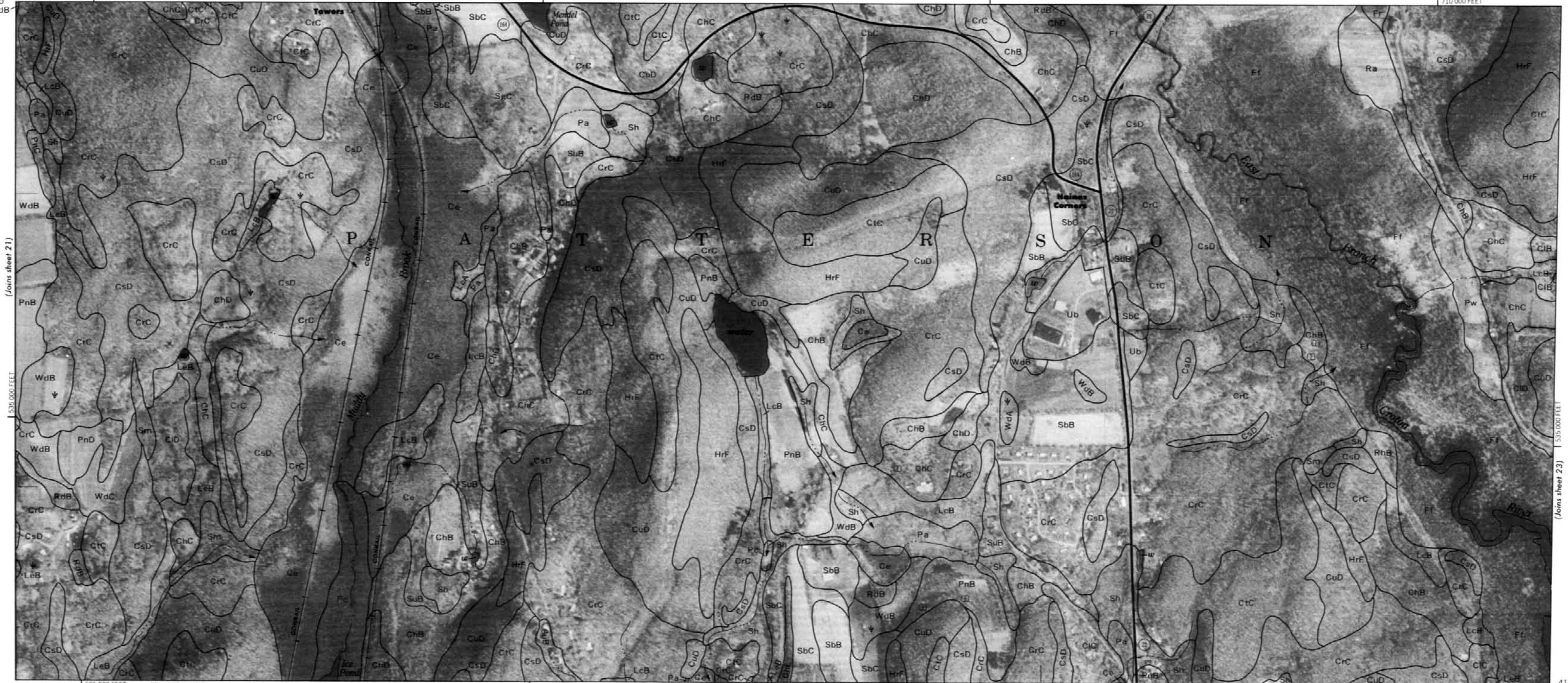
1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

(22)

N

73°37'30"
41°28'45"

(Joins sheet 14)



695 000 FEET (Joins sheet 30)

41°27'30"
73°33'45"

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 22

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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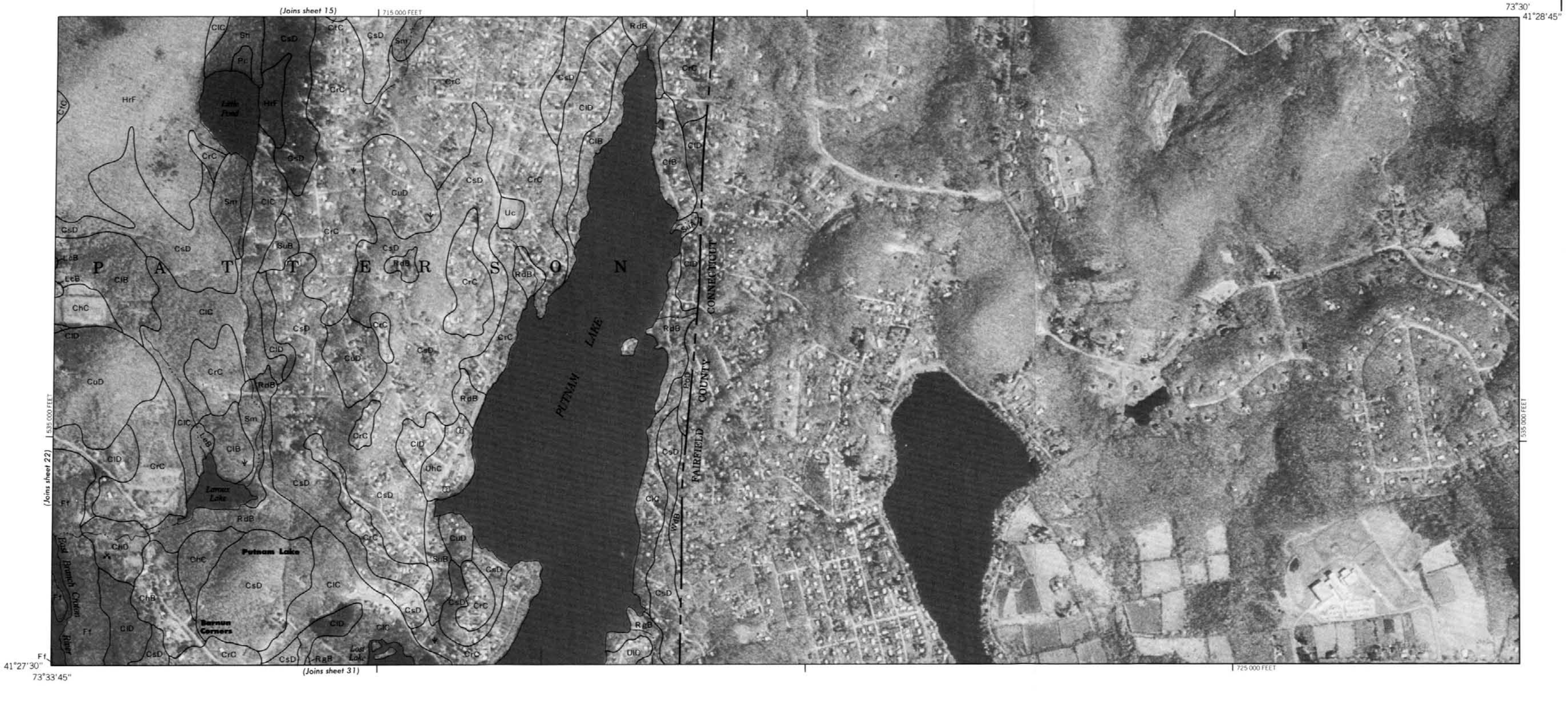
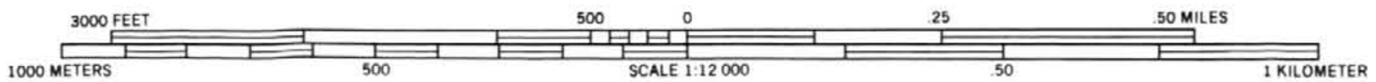
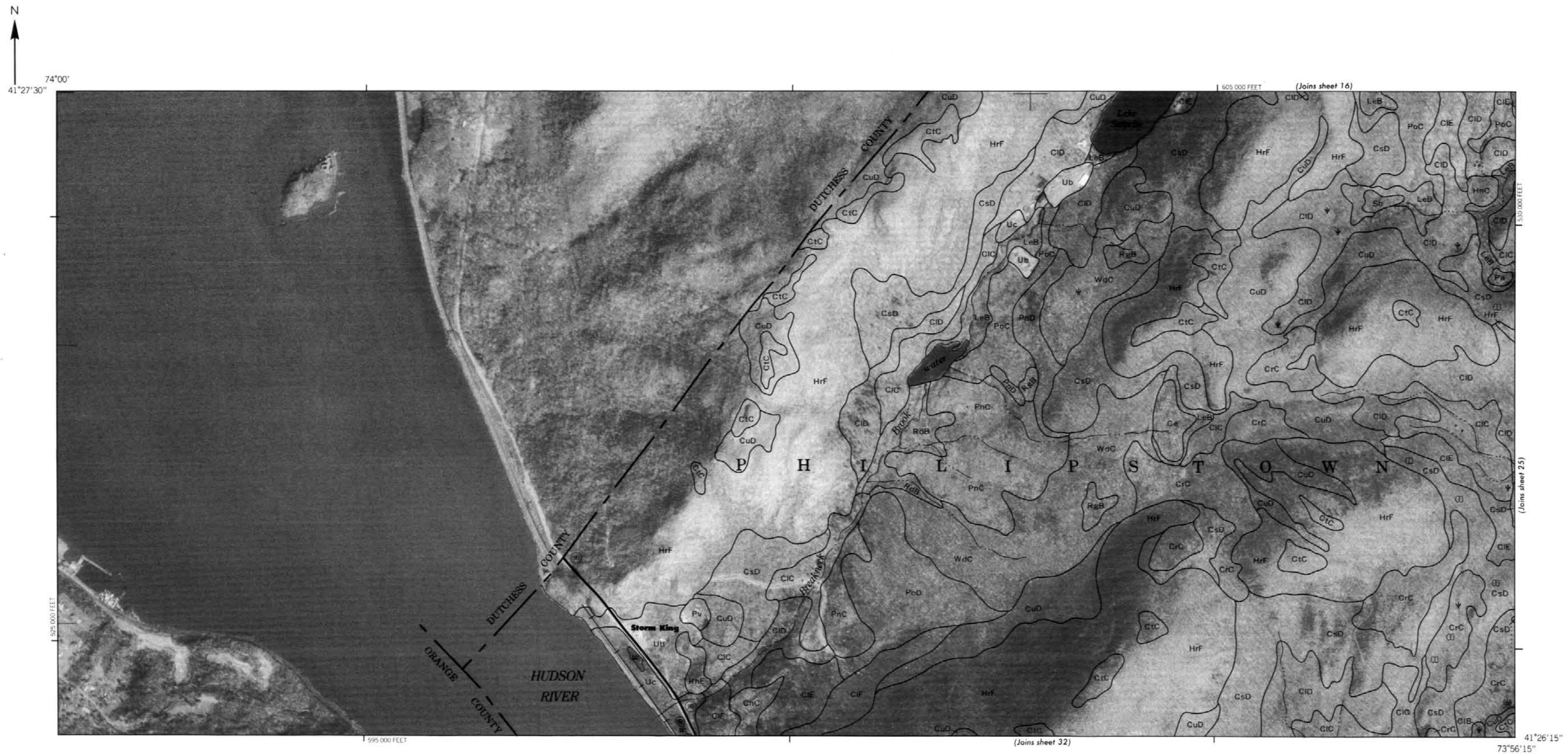
photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

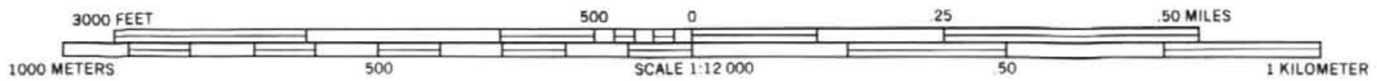
PUTNAM & WESTCHESTER COS., NEW YORK NO. 23





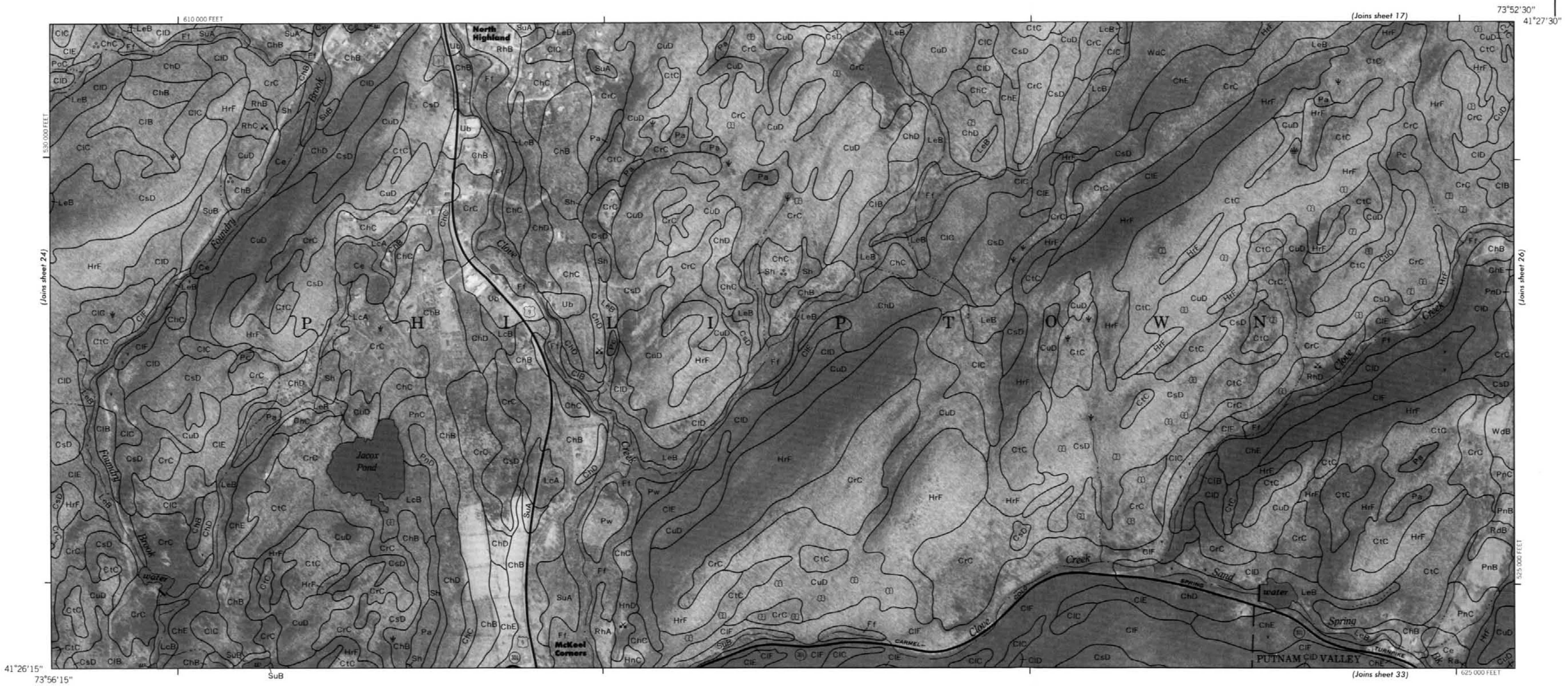
24





PUTNAM & WESTCHESTER COS., NEW YORK NO. 24

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies.
Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



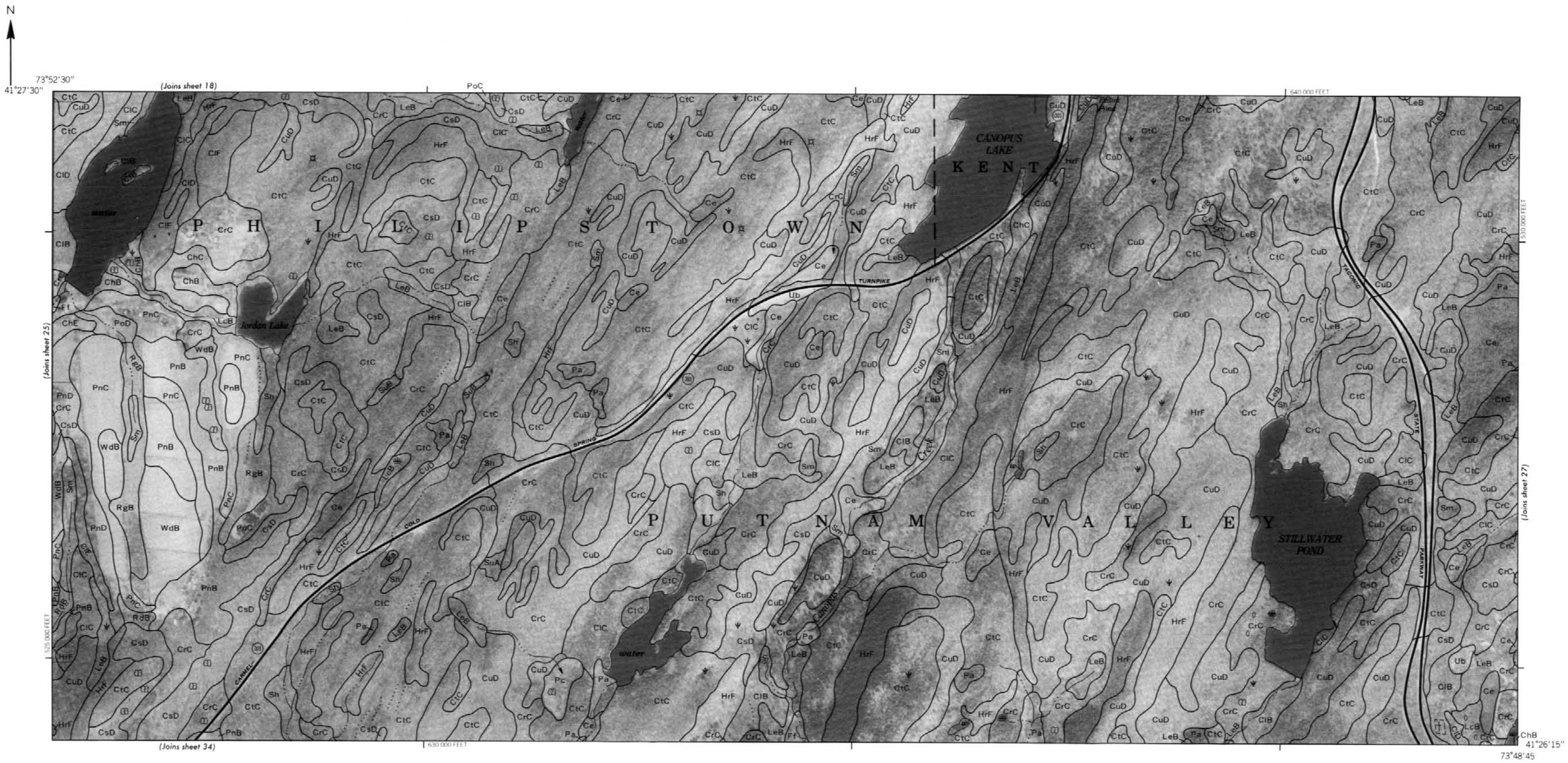
3000 FEET 500 0 25 .50 MILES

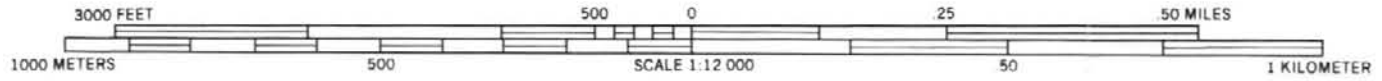
1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 25

26





PUTNAM & WESTCHESTER COS., NEW YORK NO. 26

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

27

N

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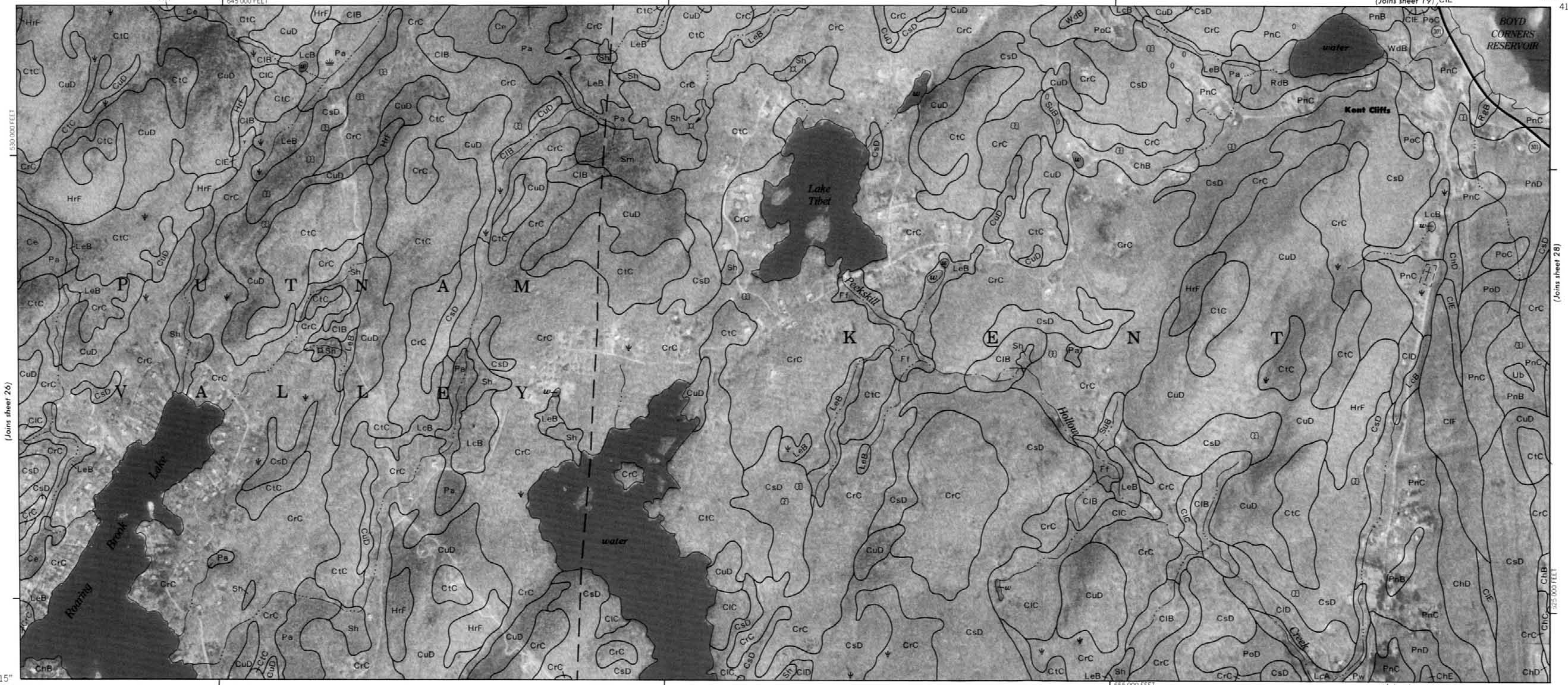
PUTNAM & WESTCHESTER COS., NEW YORK NO. 27

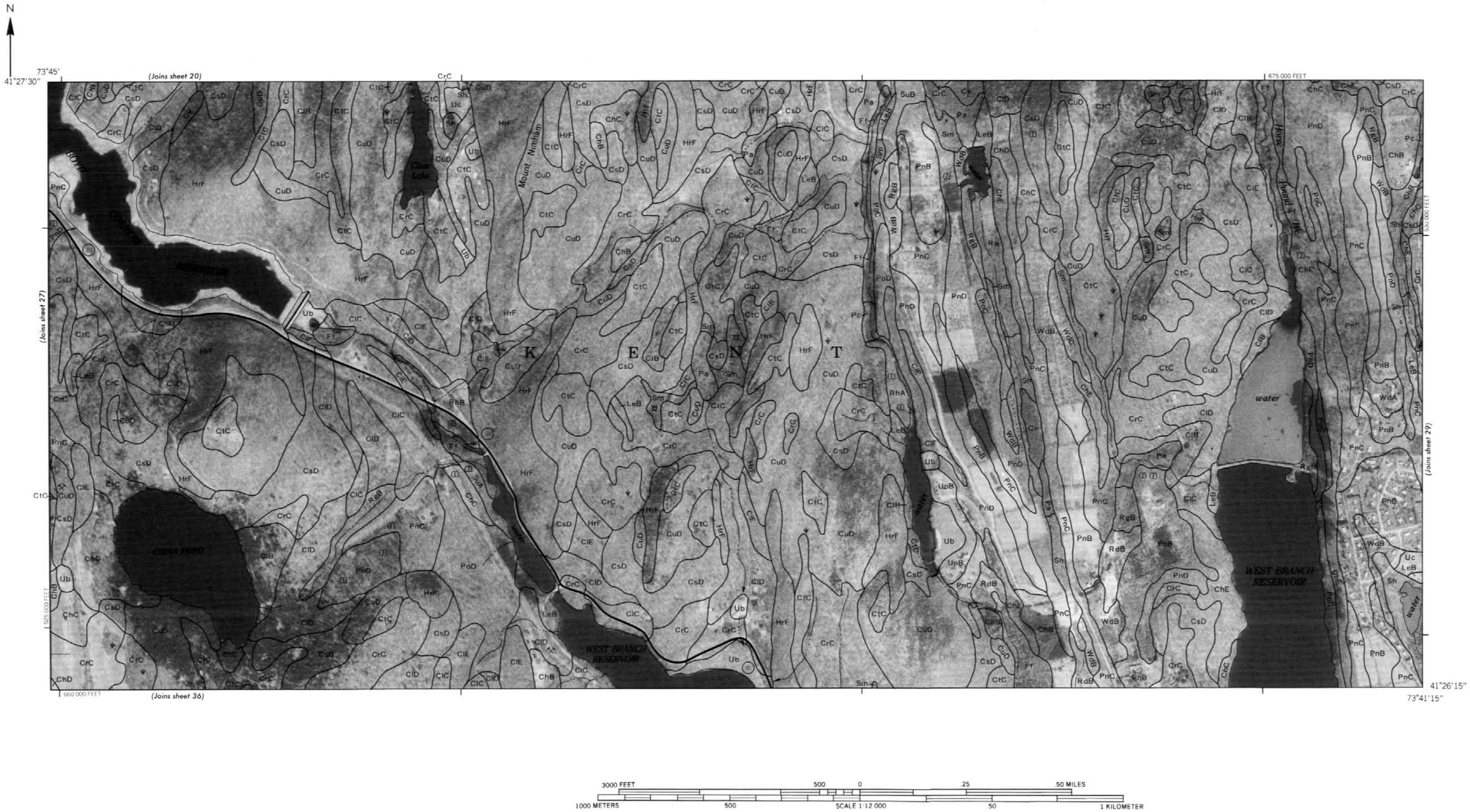
73°45'
41°27'30"



41°26'15"
73°48'45"

3000 FEET 500 0 .25 .50 MILES
1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

28



PUTNAM & WESTCHESTER COS., NEW YORK NO. 28

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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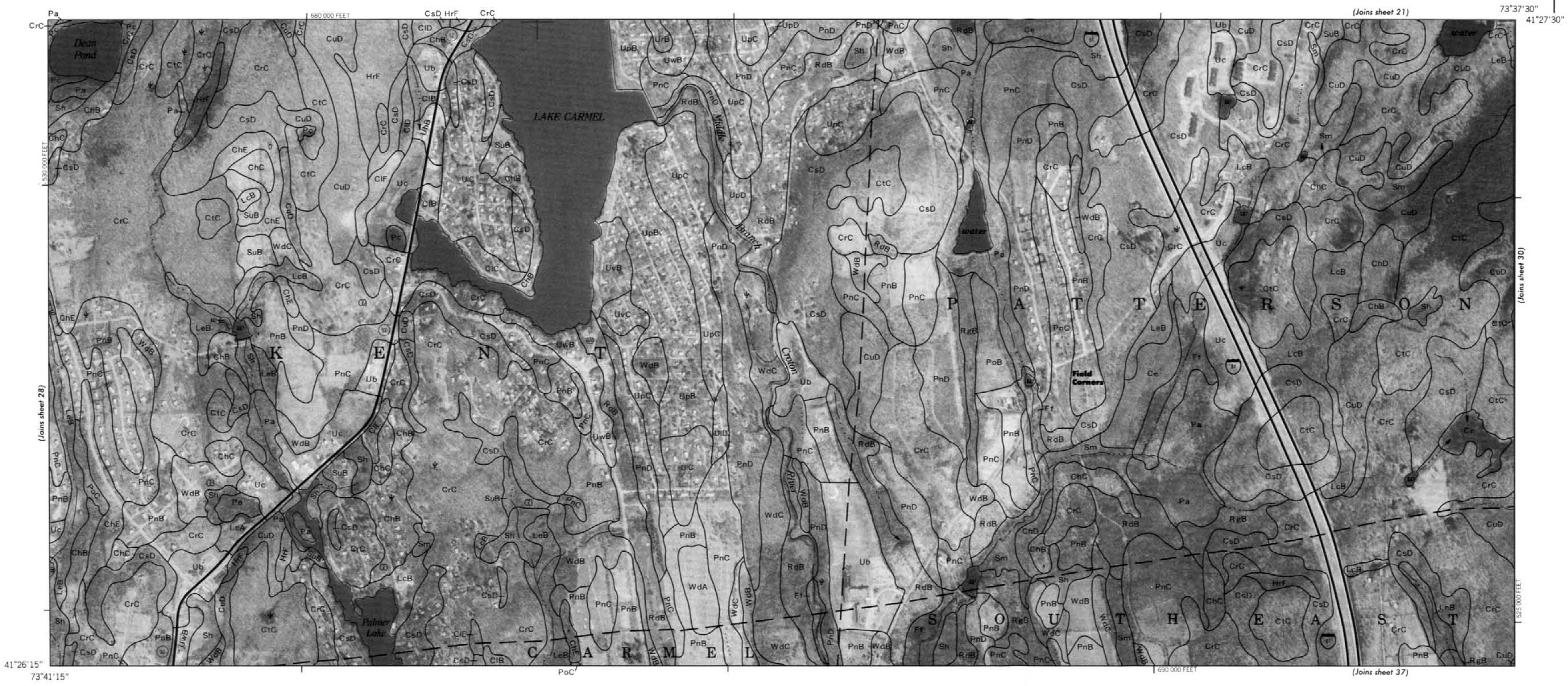
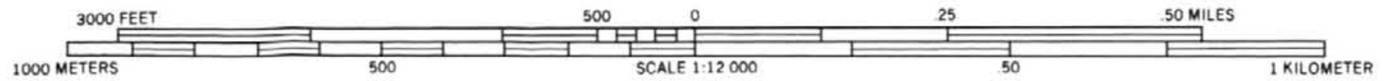
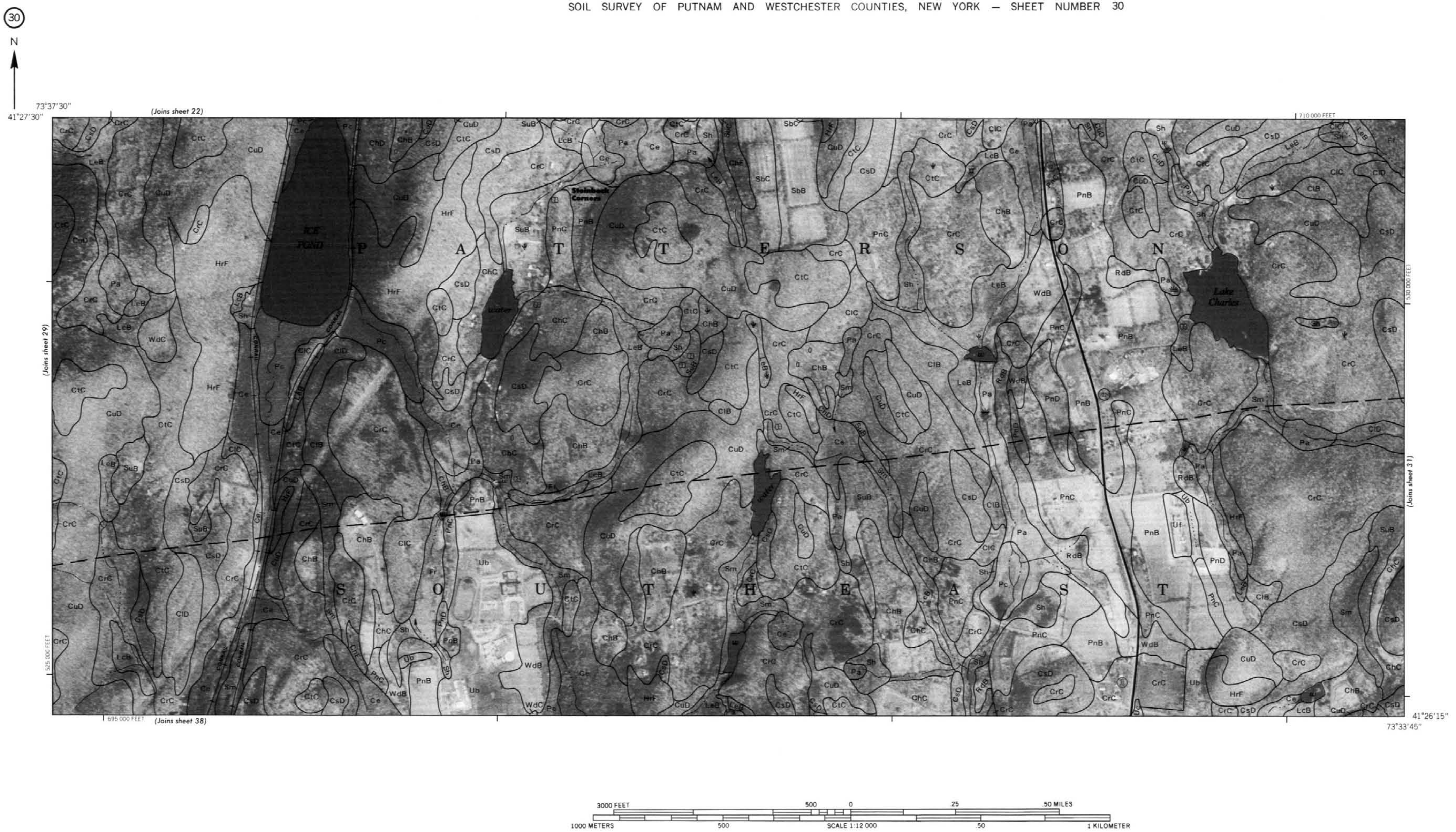
PUTNAM & WESTCHESTER COS., NEW YORK NO. 29







PUTNAM & WESTCHESTER COS., NEW YORK NO. 30

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

31

N

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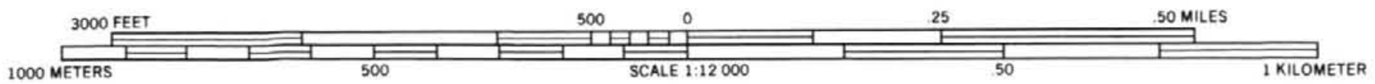
PUTNAM & WESTCHESTER COS., NEW YORK NO. 31



32

N

74°00'
41°26'15"

41°25'
73°56'15"

3000 FEET 500 0 25 .50 MILES
1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 32

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

33

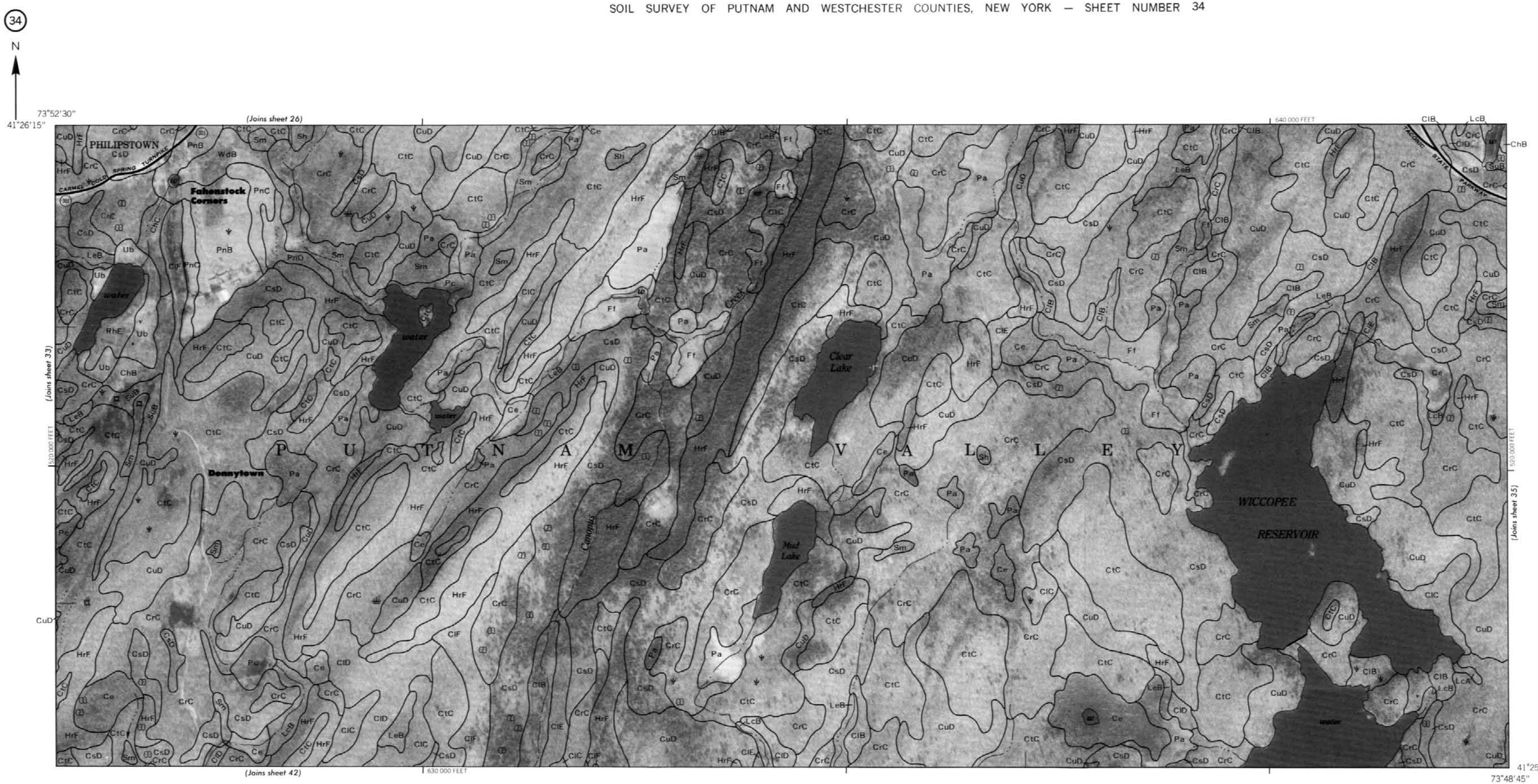
N

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 · 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 33



3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 34

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

35

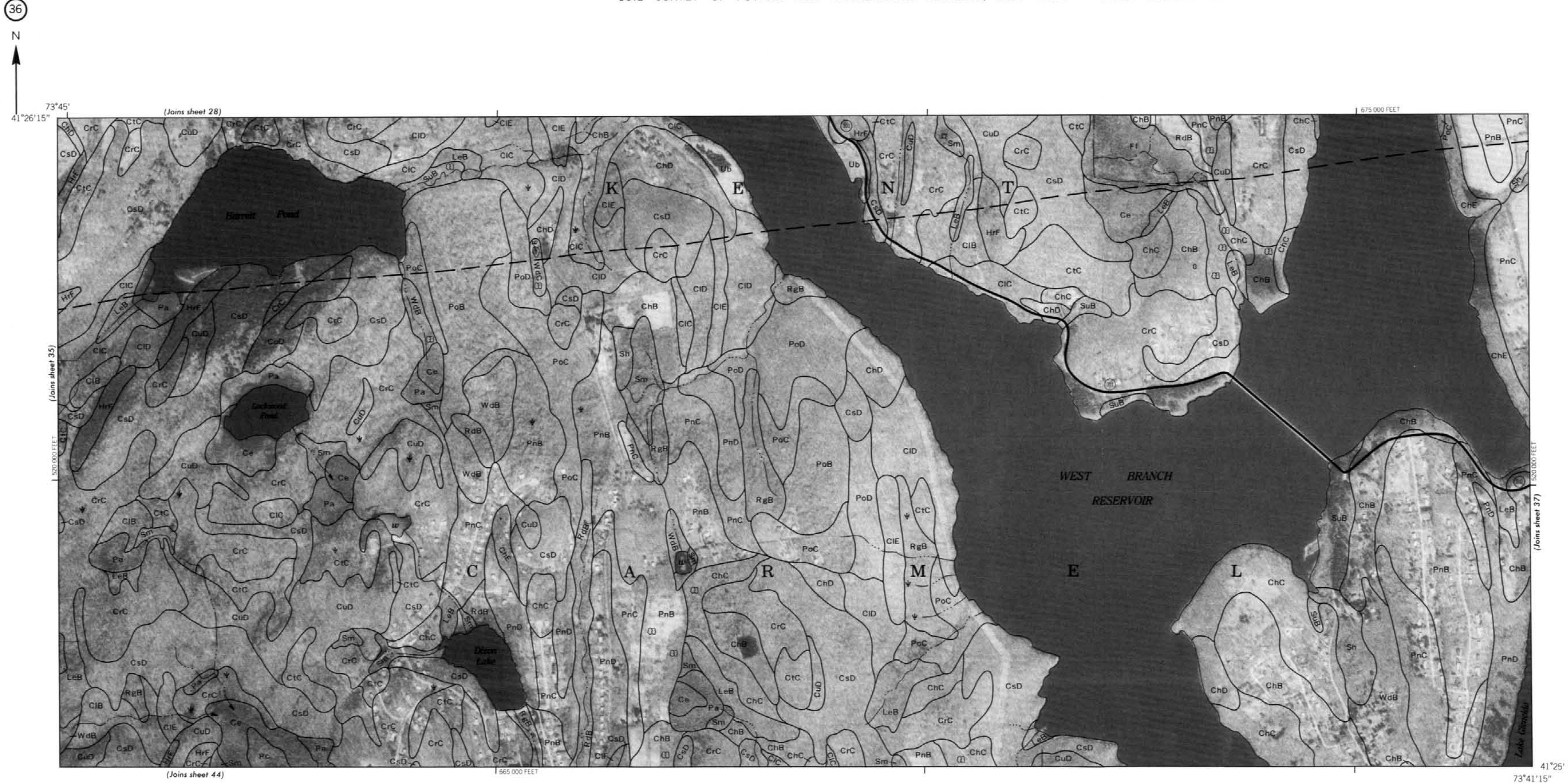
N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 35

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER



3000 FEET 500 0 25 50 MILES
1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 36

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

37

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 37

680 000 FEET

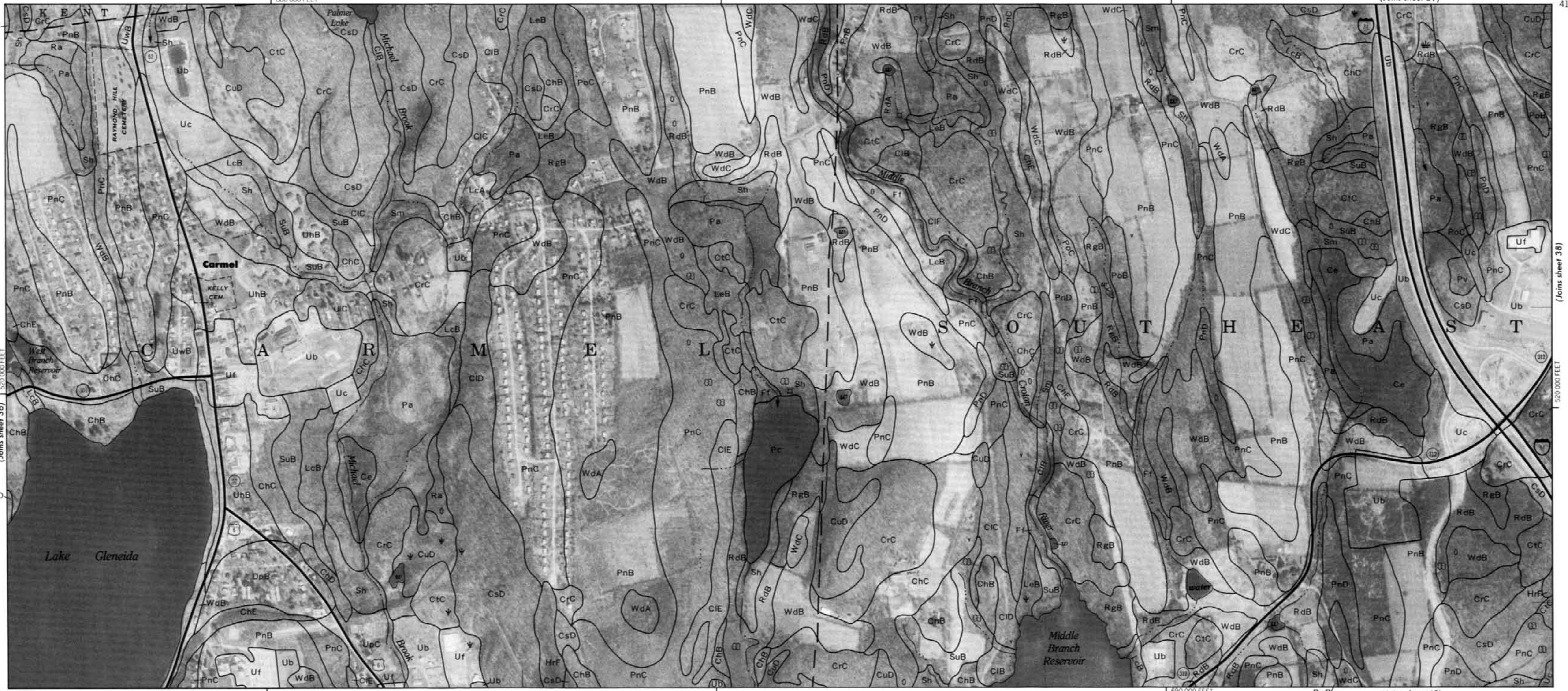
(Joins sheet 29)

73°37'30"
41°26'15"

(Joins sheet 36)

(Joins sheet 38)

520 000 FEET



41°25'
73°41'15"

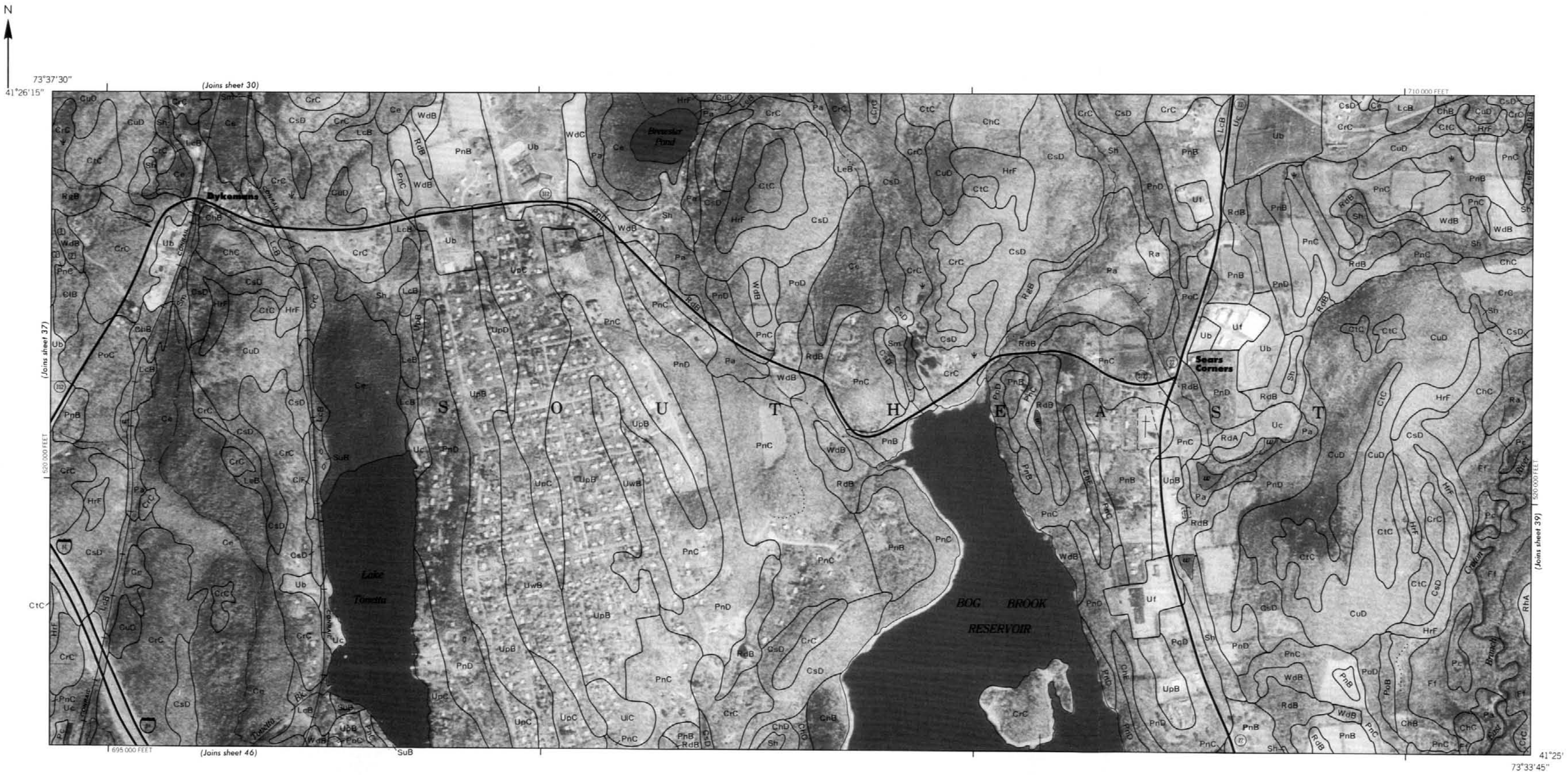
690 000 FEET

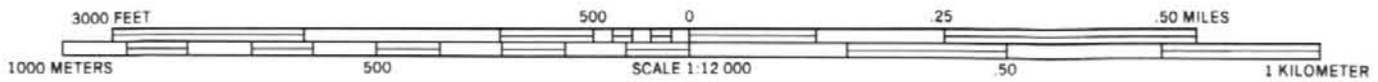
(Joins sheet 45)

3000 FEET 500 0 25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

SOIL SURVEY OF PUTNAM AND WESTCHESTER COUNTIES, NEW YORK — SHEET NUMBER 38





PUTNAM & WESTCHESTER COS., NEW YORK NO. 38

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

39

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

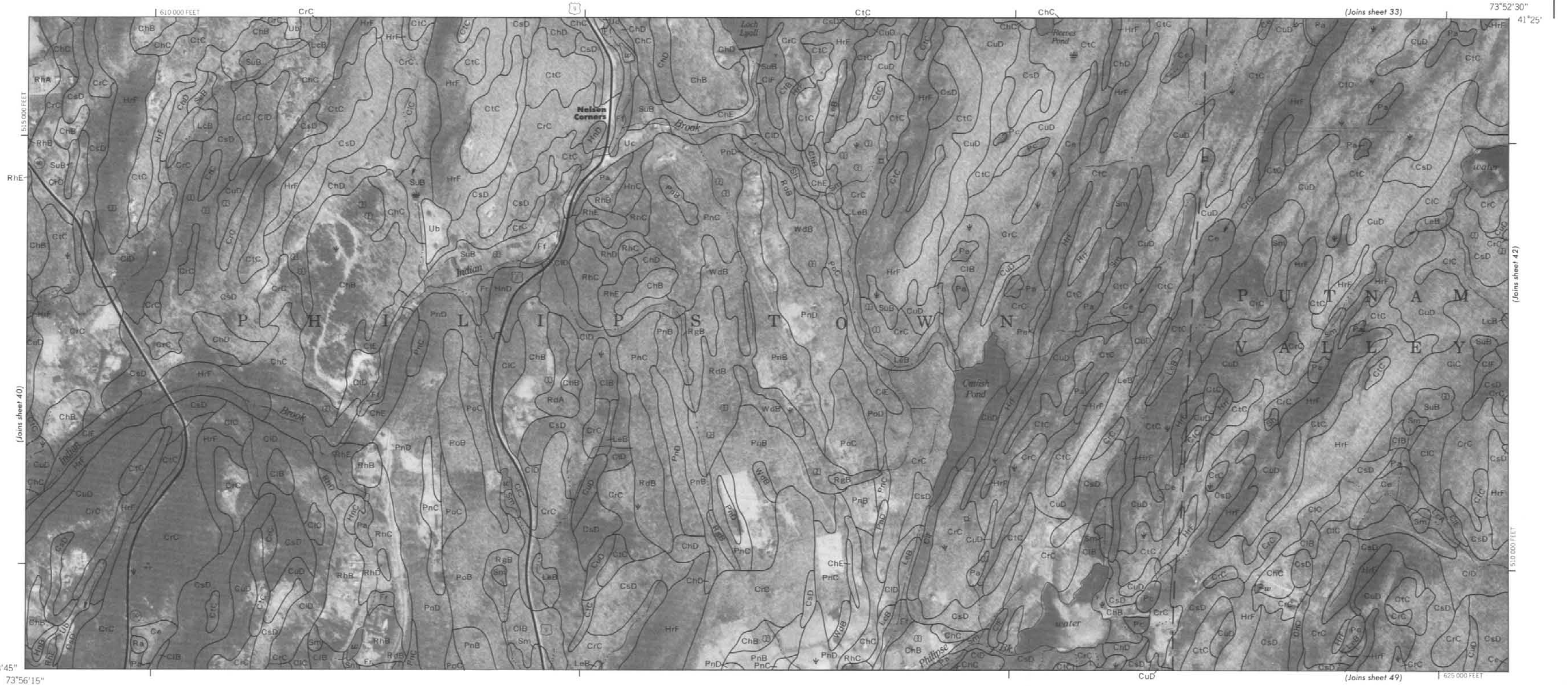
PUTNAM & WESTCHESTER COS., NEW YORK NO. 39

3000 FEET 500 0 .25 .50 MILES
1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 40

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

41

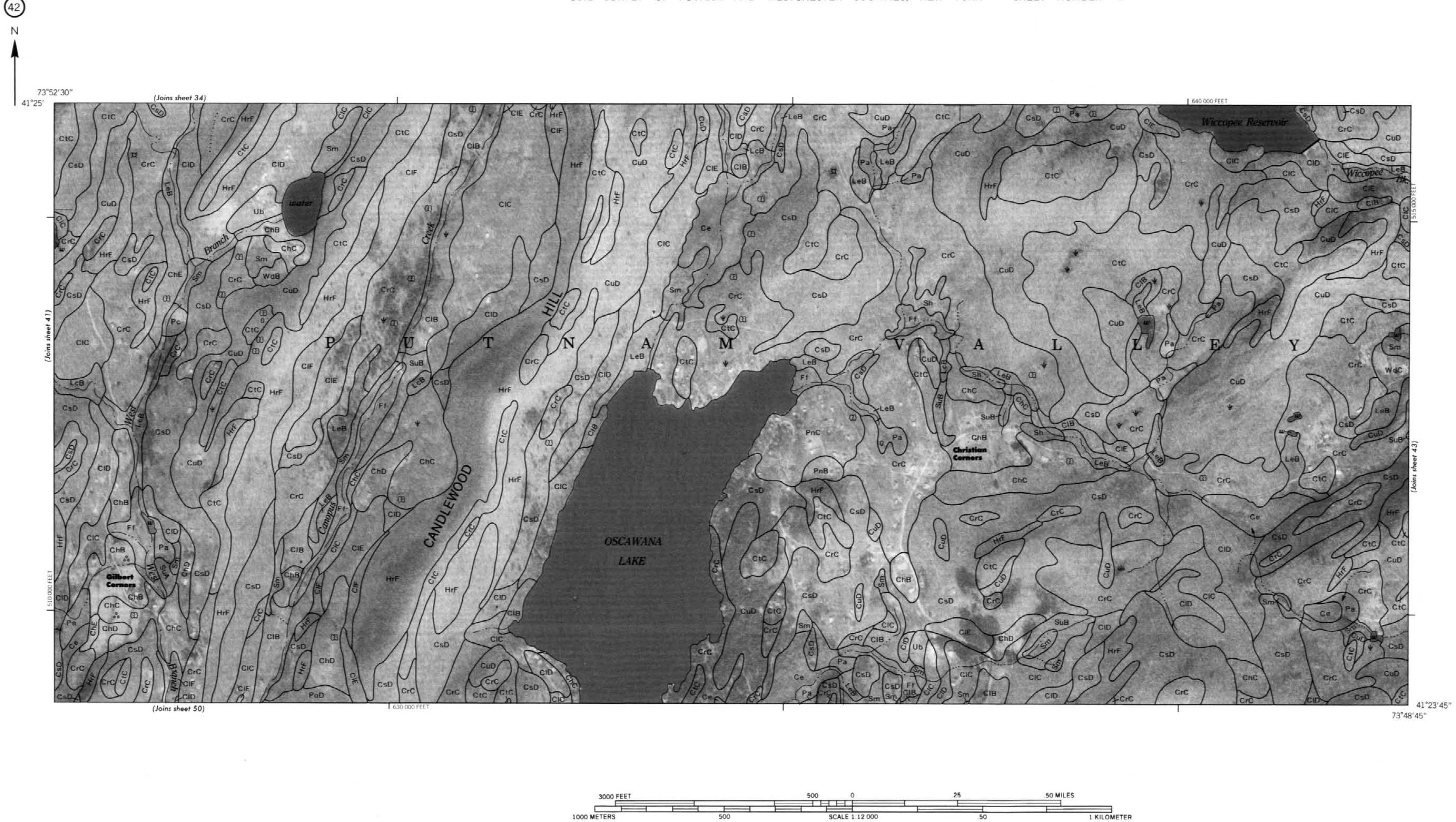


This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 41

3000 FEET 500 0 25 50 MILES

1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER



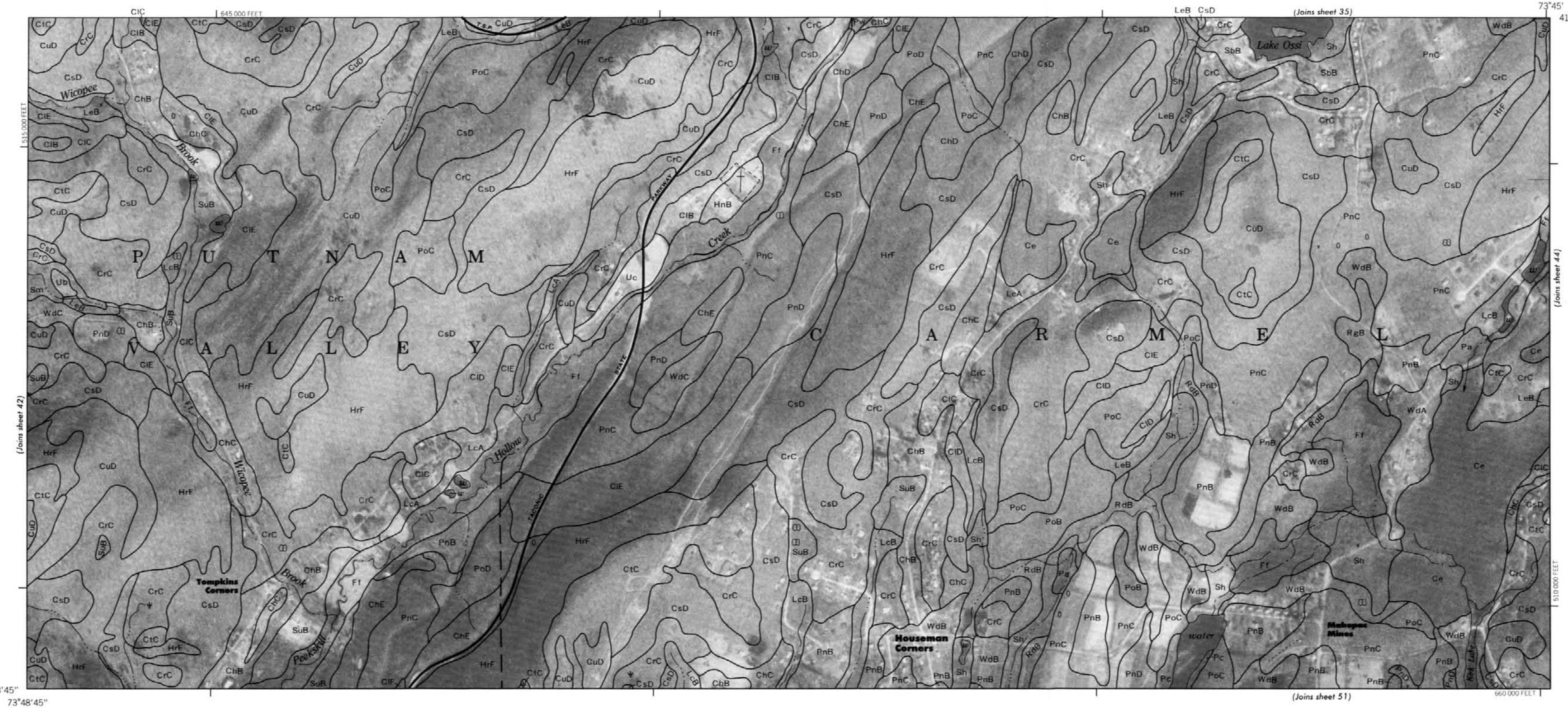
PUTNAM & WESTCHESTER COS., NEW YORK NO. 42

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

43

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.
PUTNAM & WESTCHESTER COS., NEW YORK NO. 43



3000 FEET 500 0 25 50 MILES
1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

44

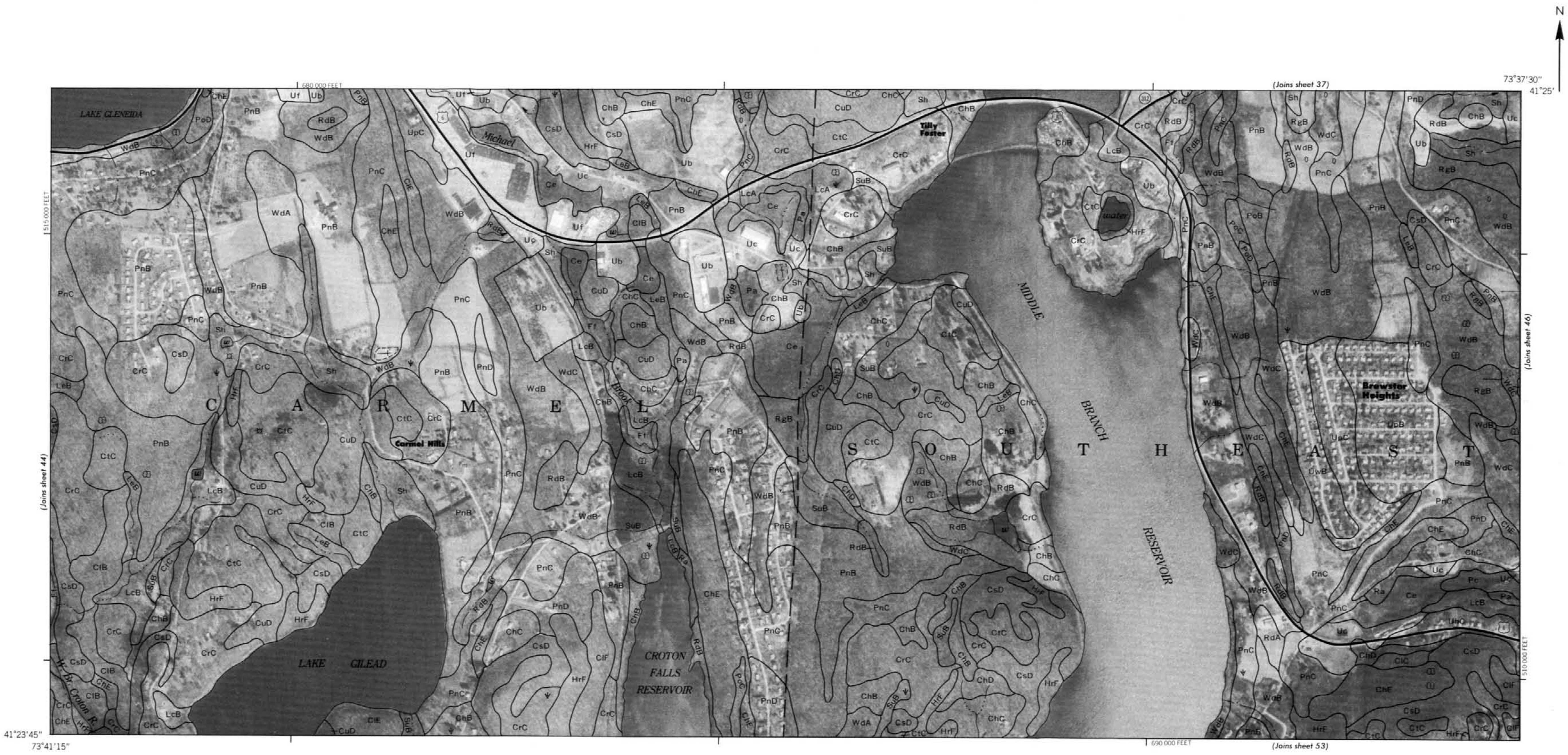
N

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 44

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 45

PUTNAM & WESTCHESTER COS., NEW YORK NO. 46

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

47

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 47

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

48

N

74°00'

41°23'45"

605 000 FEET (Joins sheet 40)

505 000 FEET

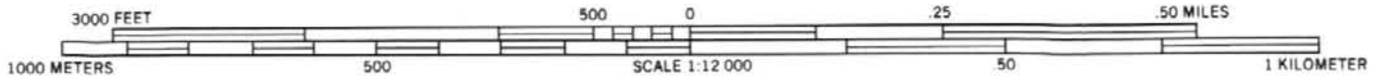
(Joins sheet 49)

595 000 FEET

(Joins sheet 56)

41°22'30"

73°56'15"

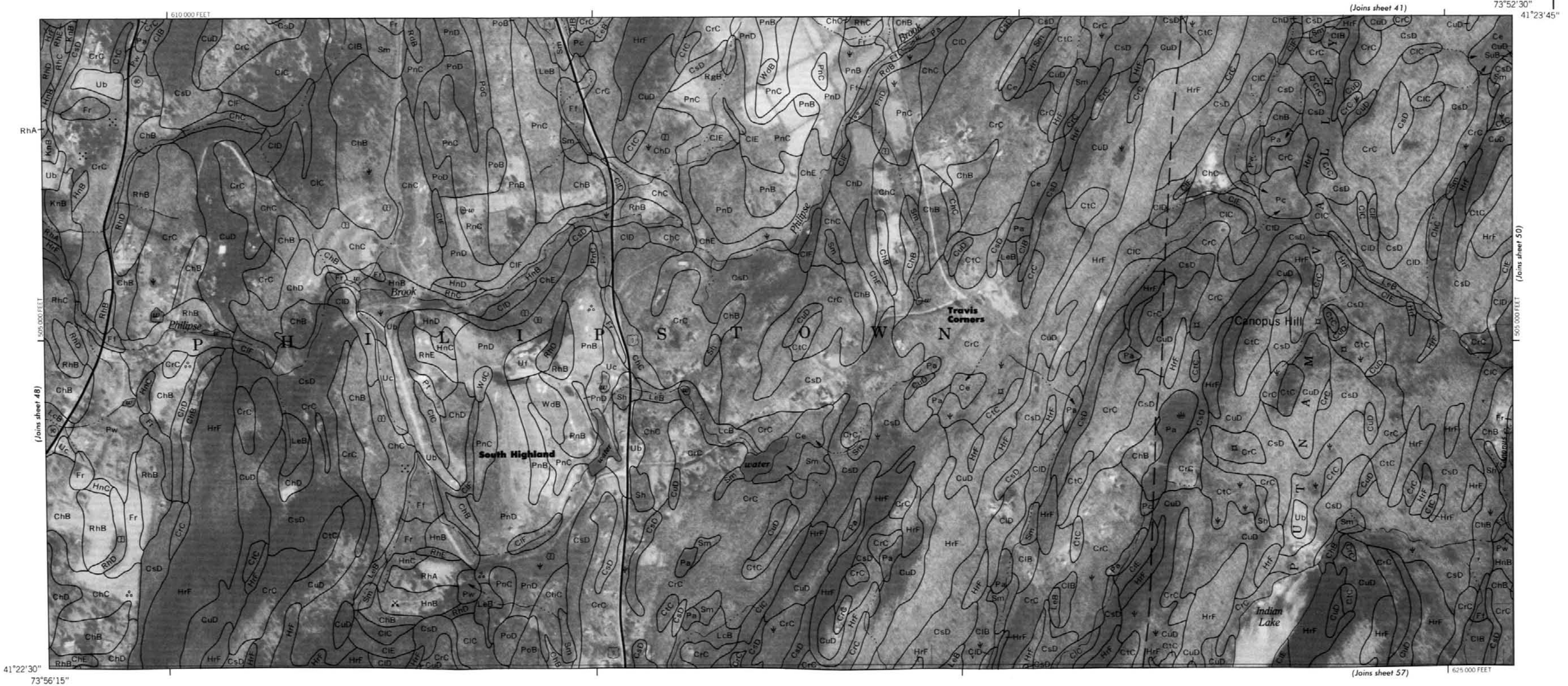


PUTNAM & WESTCHESTER COS., NEW YORK NO. 48

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

49

N



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

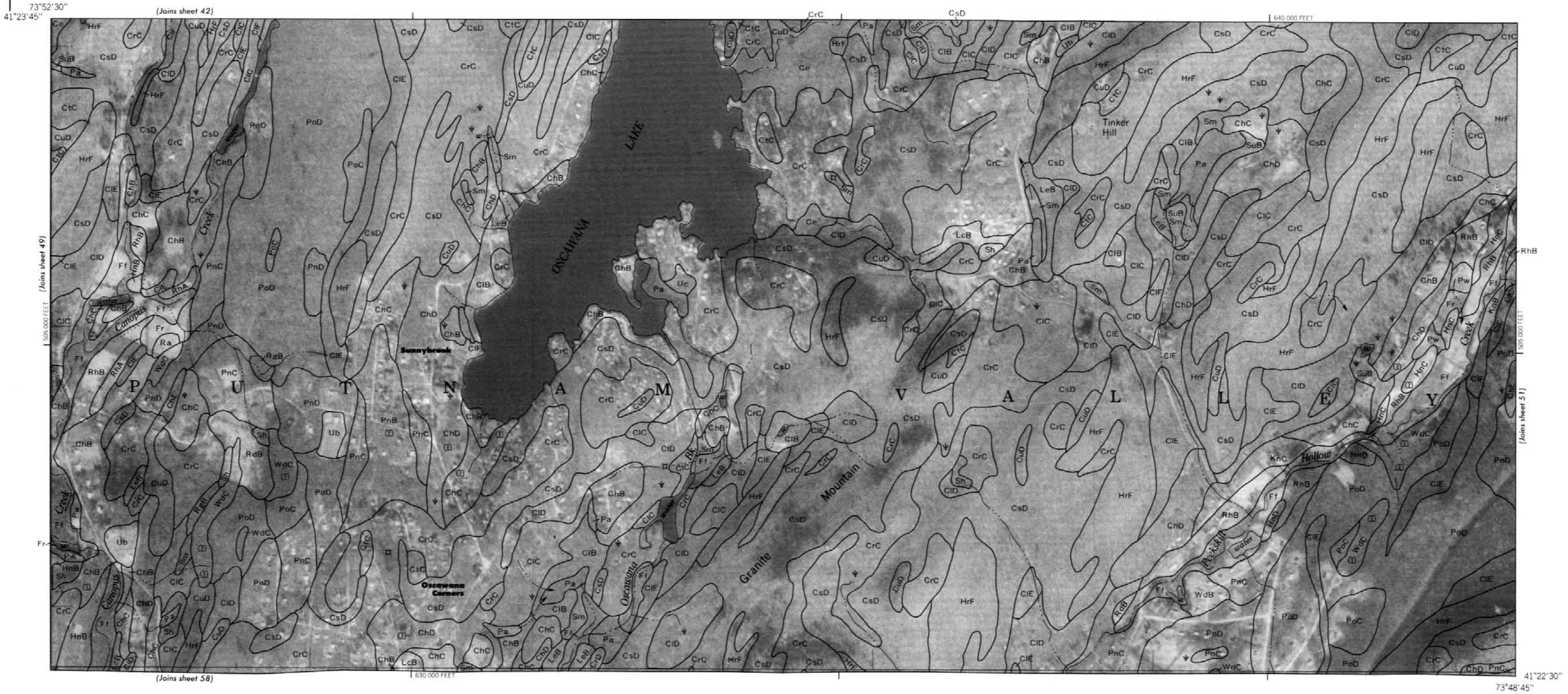
PUTNAM & WESTCHESTER COS., NEW YORK NO. 49

3000 FEET 500 0 25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

50

N

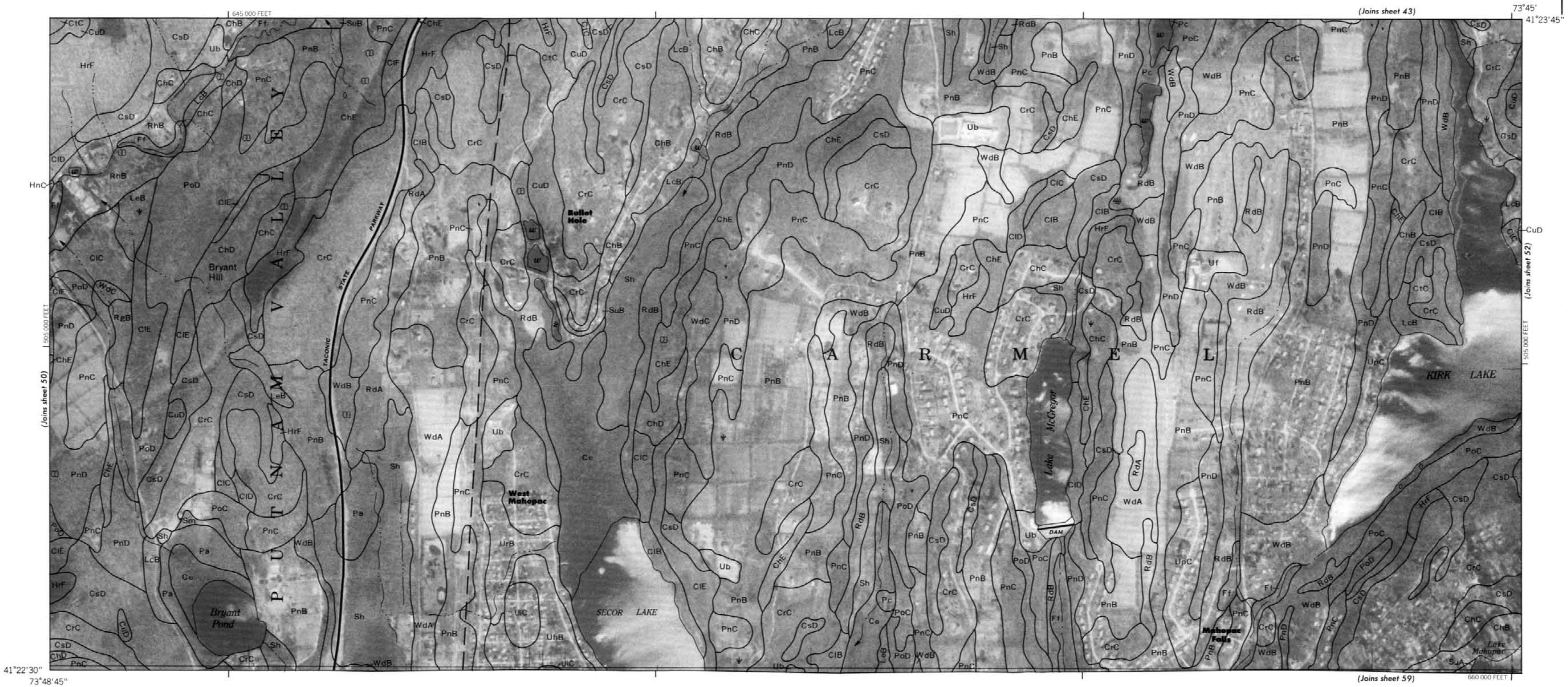


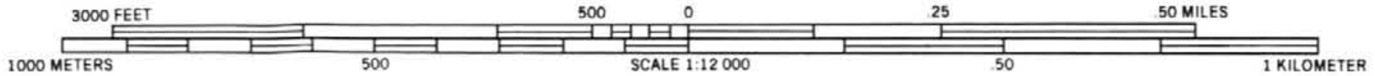
3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 50

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



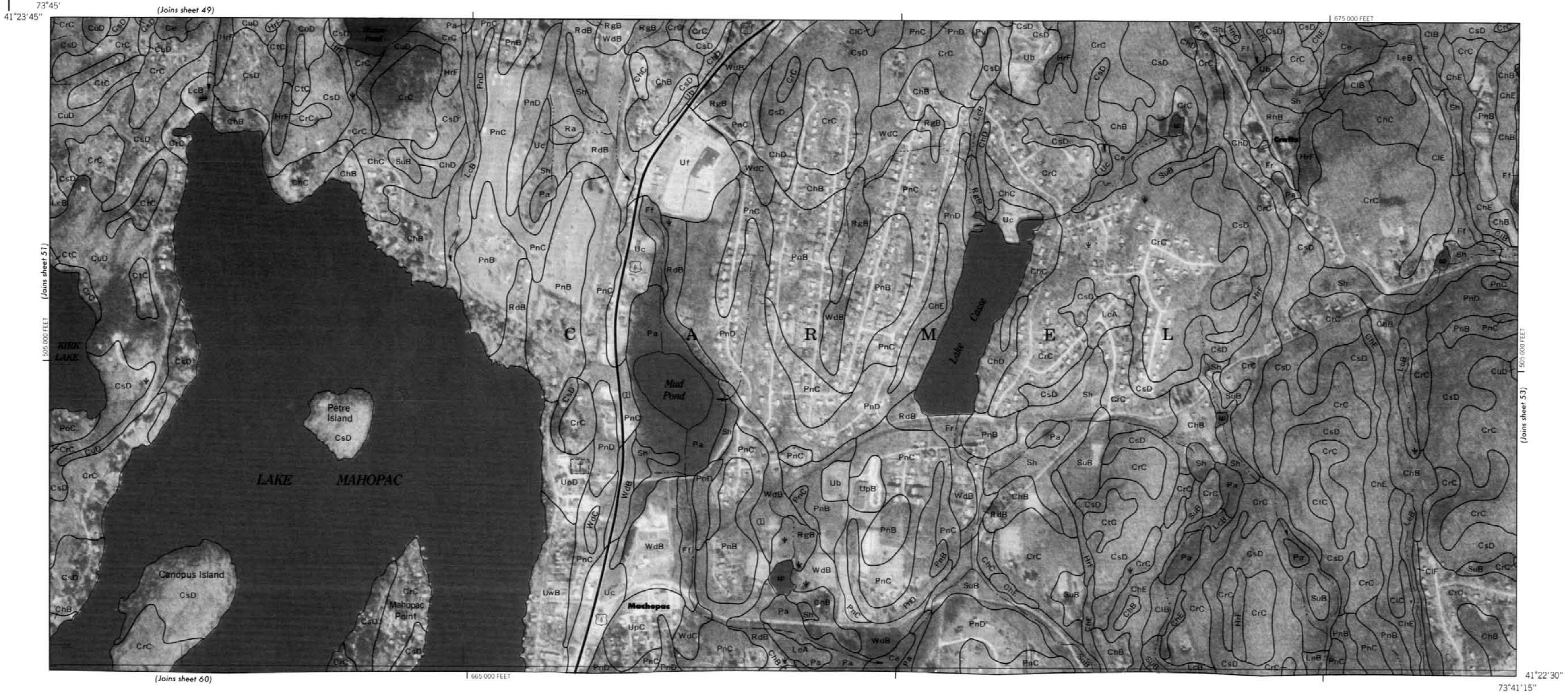


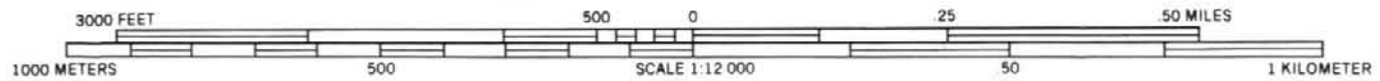
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 51

52

N



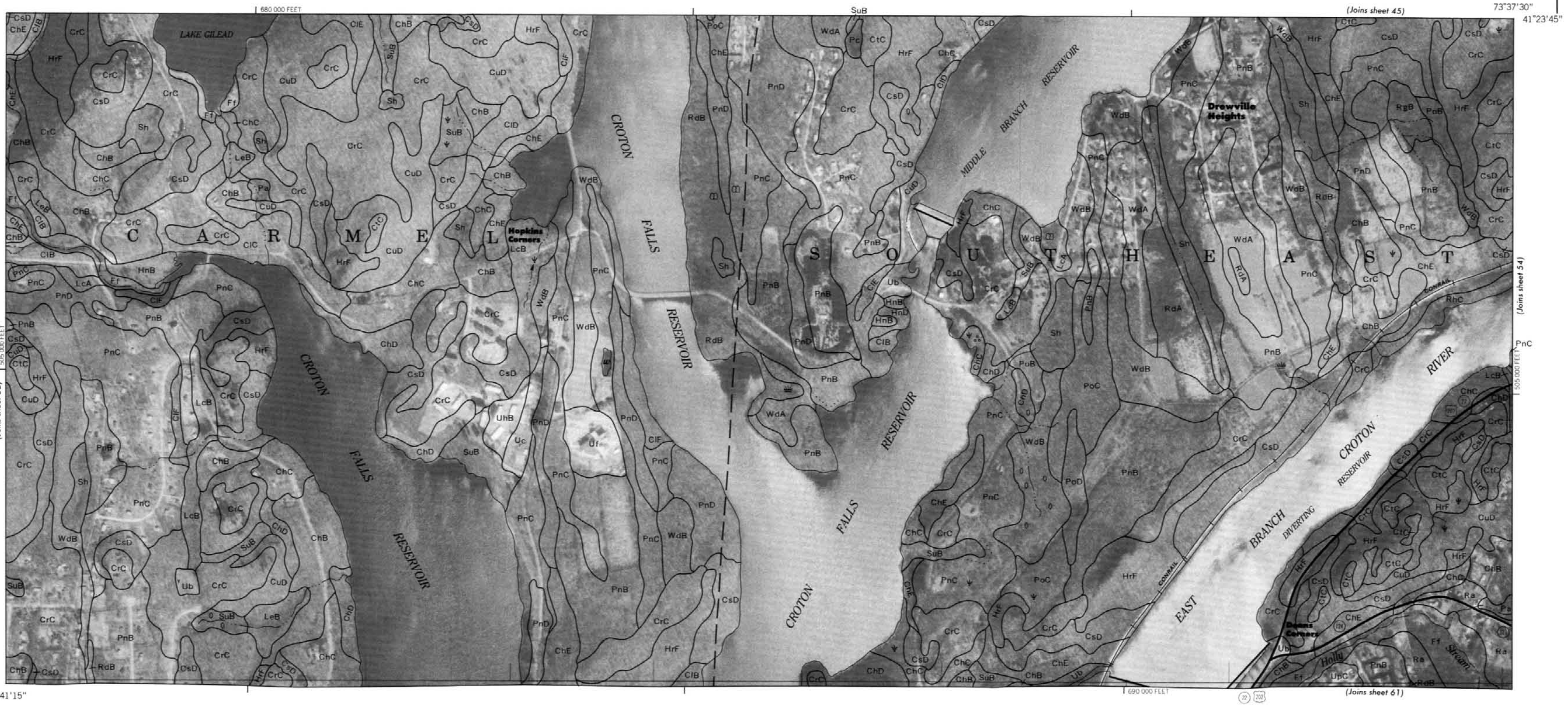


PUTNAM & WESTCHESTER COS., NEW YORK NO. 52

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 53

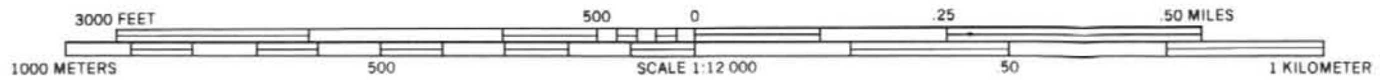


3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

54

N



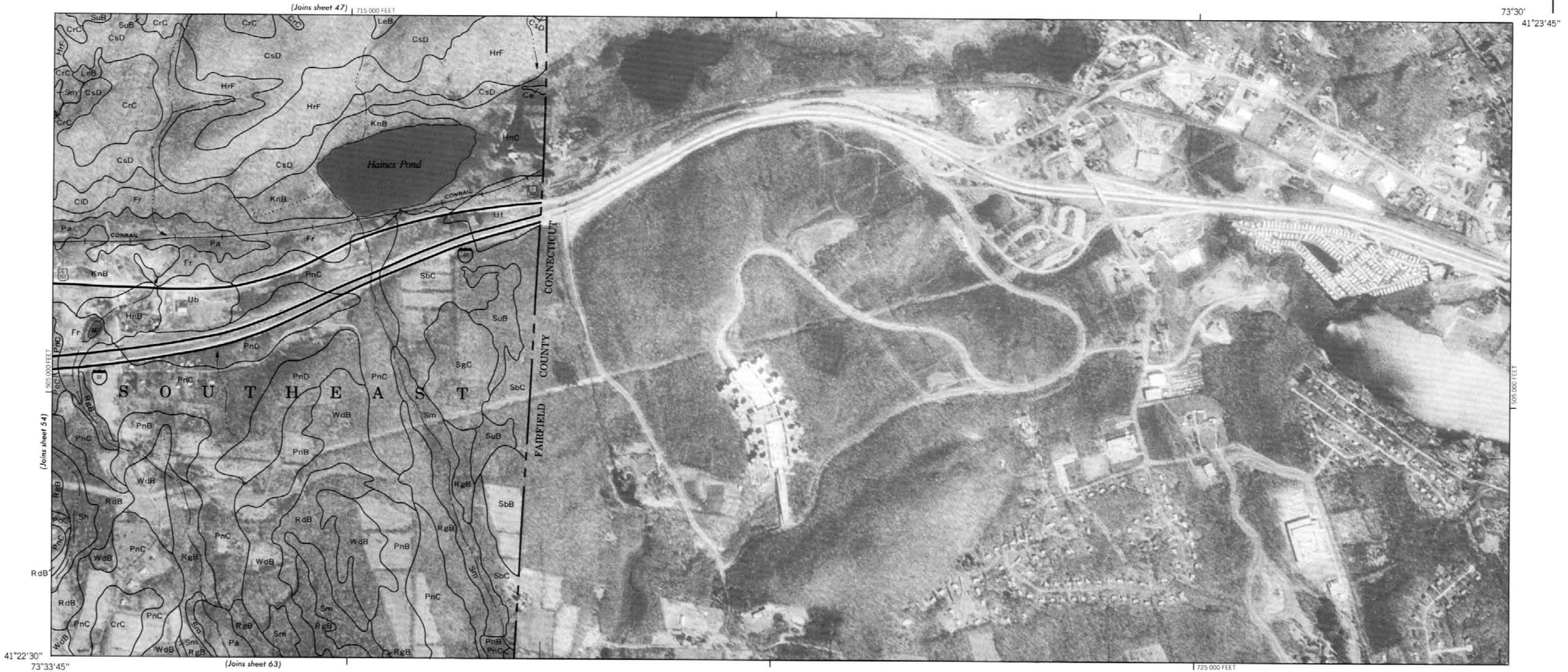
PUTNAM & WESTCHESTER COS., NEW YORK NO. 54

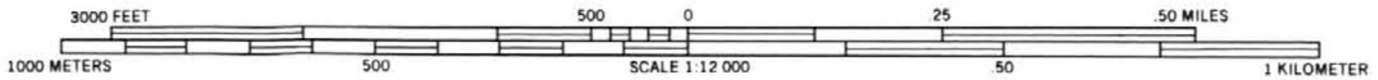
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

55

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies.
Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial
photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.
PUTNAM & WESTCHESTER COS., NEW YORK NO. 55





56

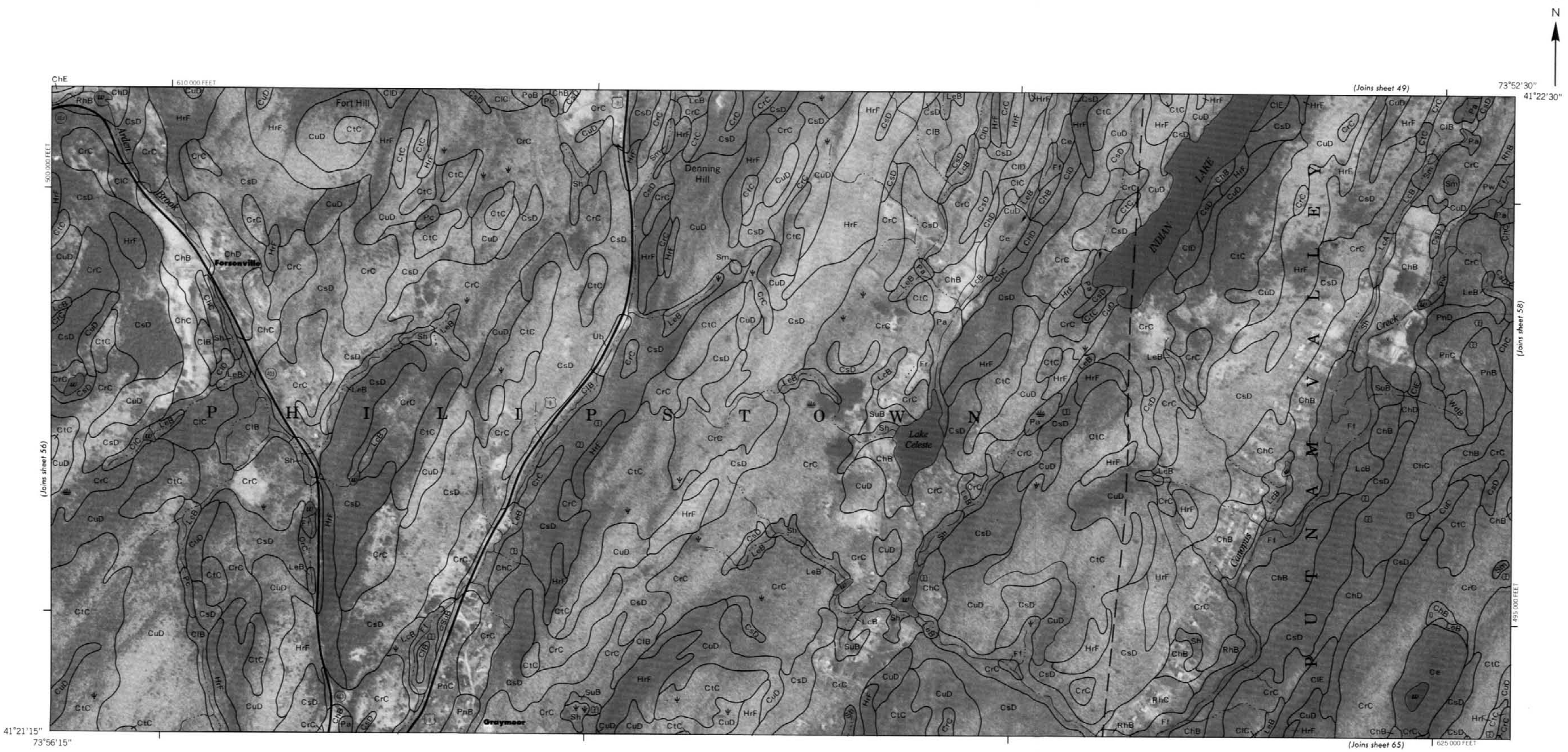
N

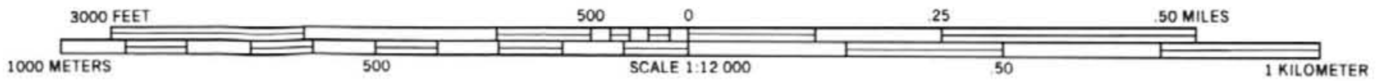
PUTNAM & WESTCHESTER COS., NEW YORK NO. 56

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER





This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 57

PUTNAM & WESTCHESTER COS., NEW YORK NO. 58

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

59

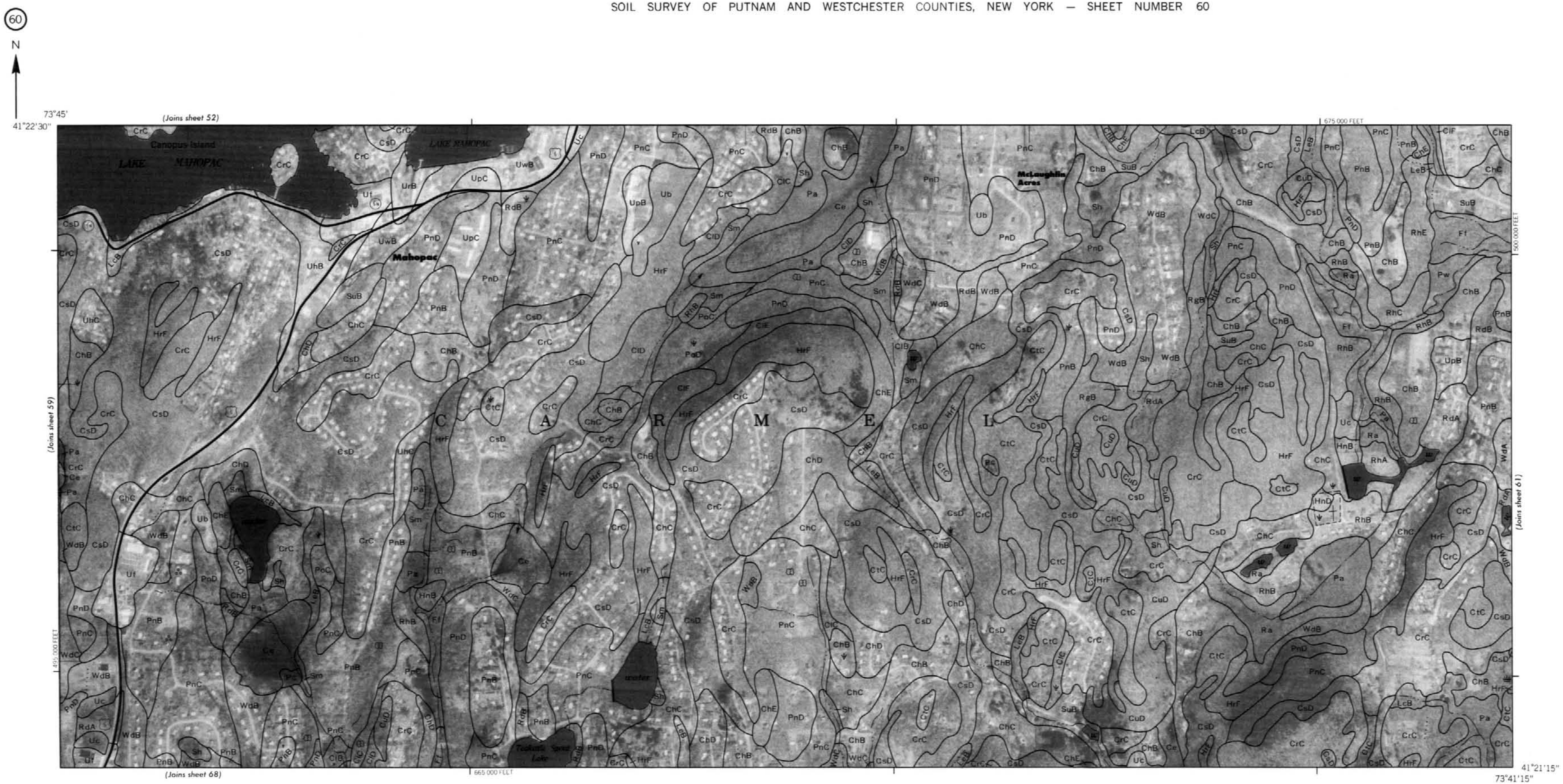
N

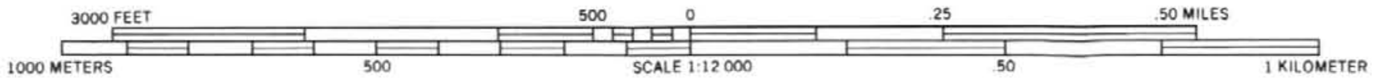
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 59

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

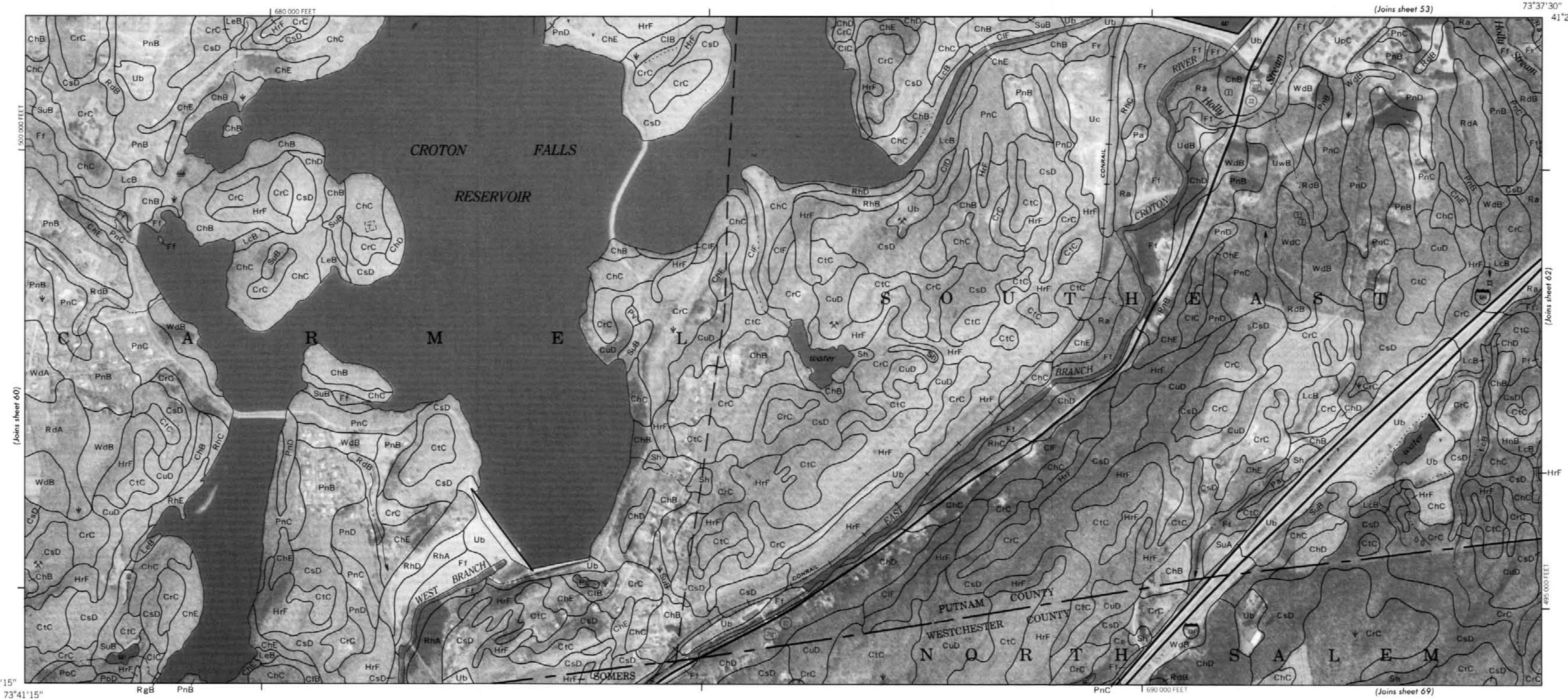




PUTNAM & WESTCHESTER COS., NEW YORK NO. 60

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 61

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

62

PUTNAM & WESTCHESTER COS., NEW YORK NO. 62

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

3000 FEET 500 0 25 50 MILES

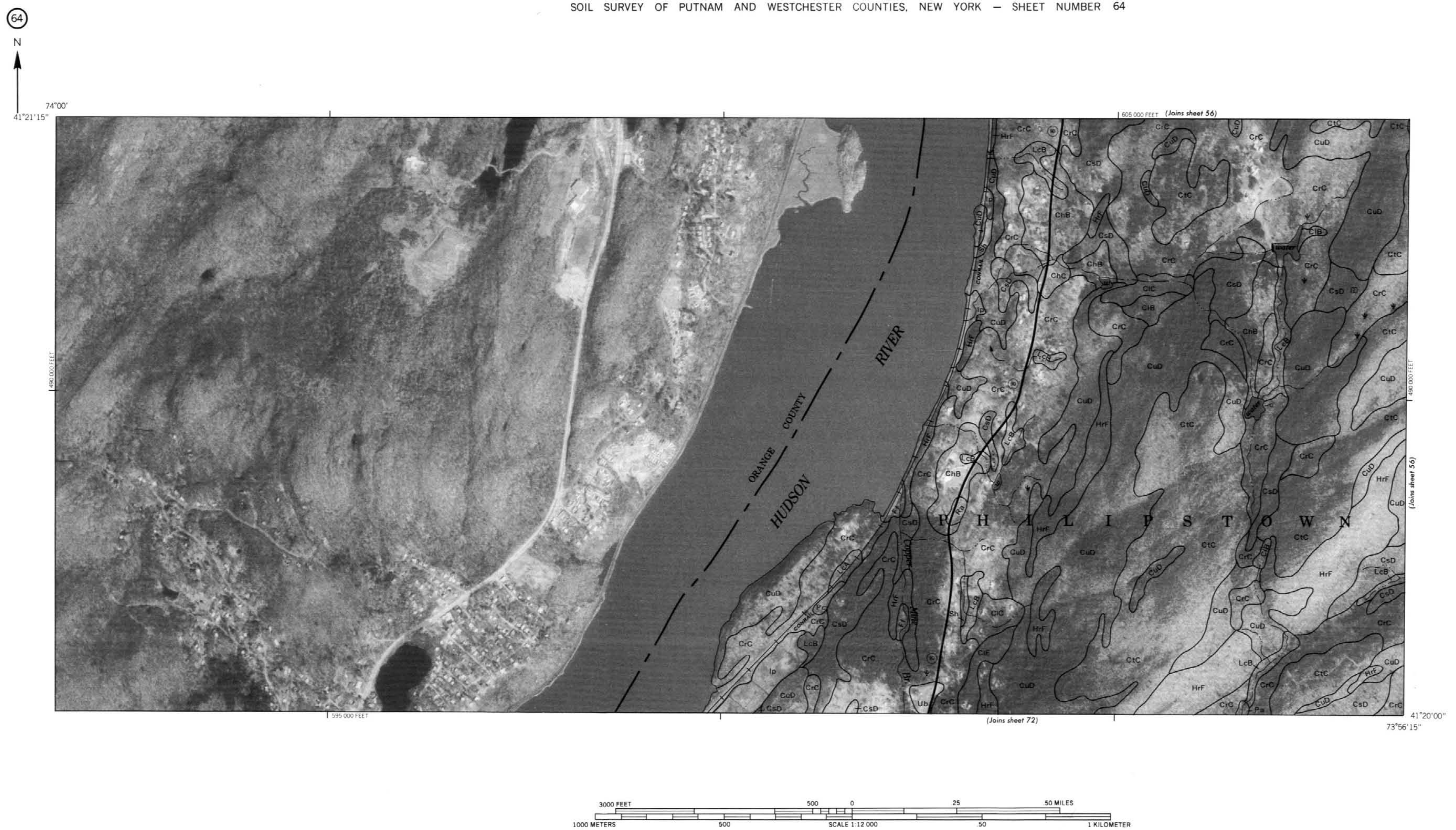
1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 63

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER



PUTNAM & WESTCHESTER COS., NEW YORK NO. 64

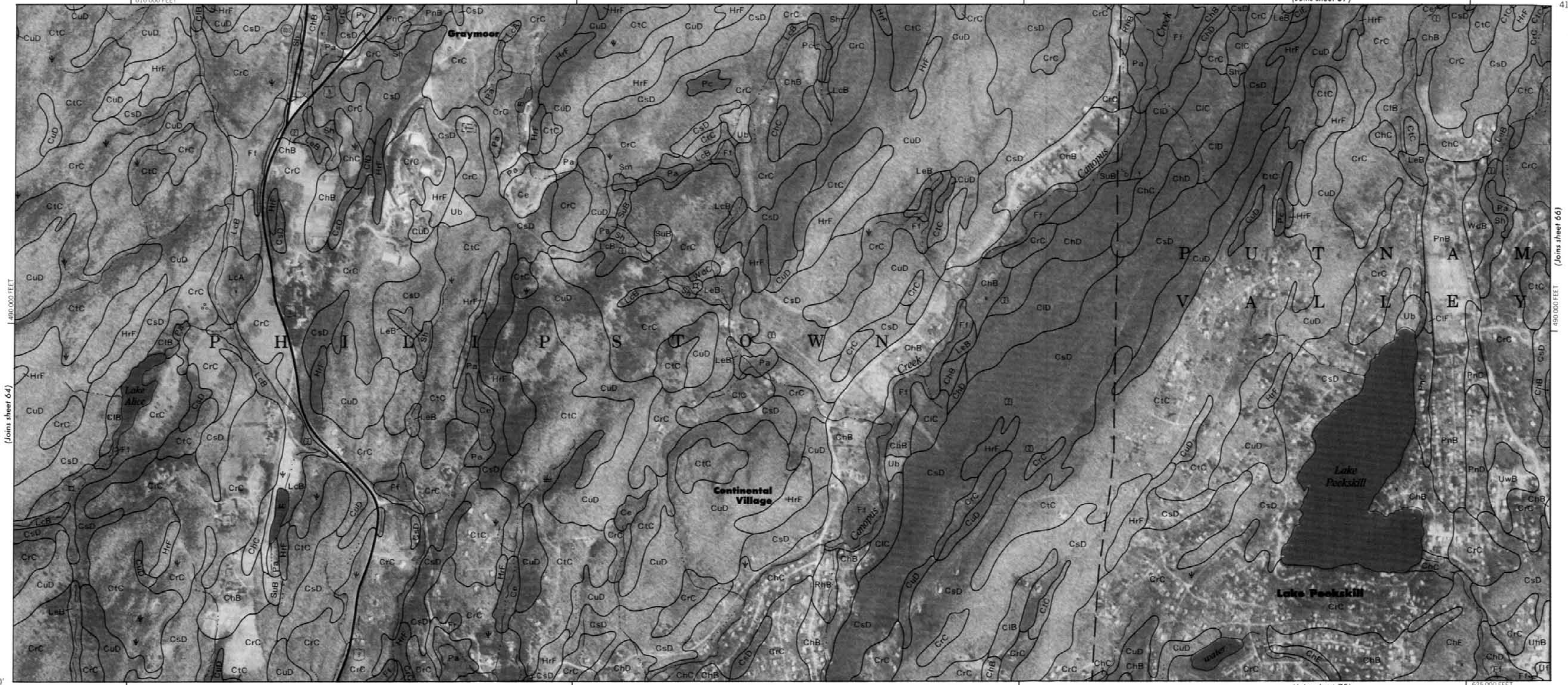
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

65

N

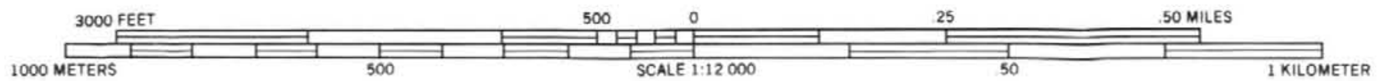
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.
PUTNAM & WESTCHESTER COS., NEW YORK NO. 65

73°52'30"
41°21'15"



41°20'
73°56'15"

3000 FEET 500 0 25 .50 MILES
1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER



PUTNAM & WESTCHESTER COS., NEW YORK NO. 66

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 67

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

SOIL SURVEY OF PUTNAM AND WESTCHESTER COUNTIES, NEW YORK — SHEET NUMBER 68

3000 FEET 500 0 25 50 MILES

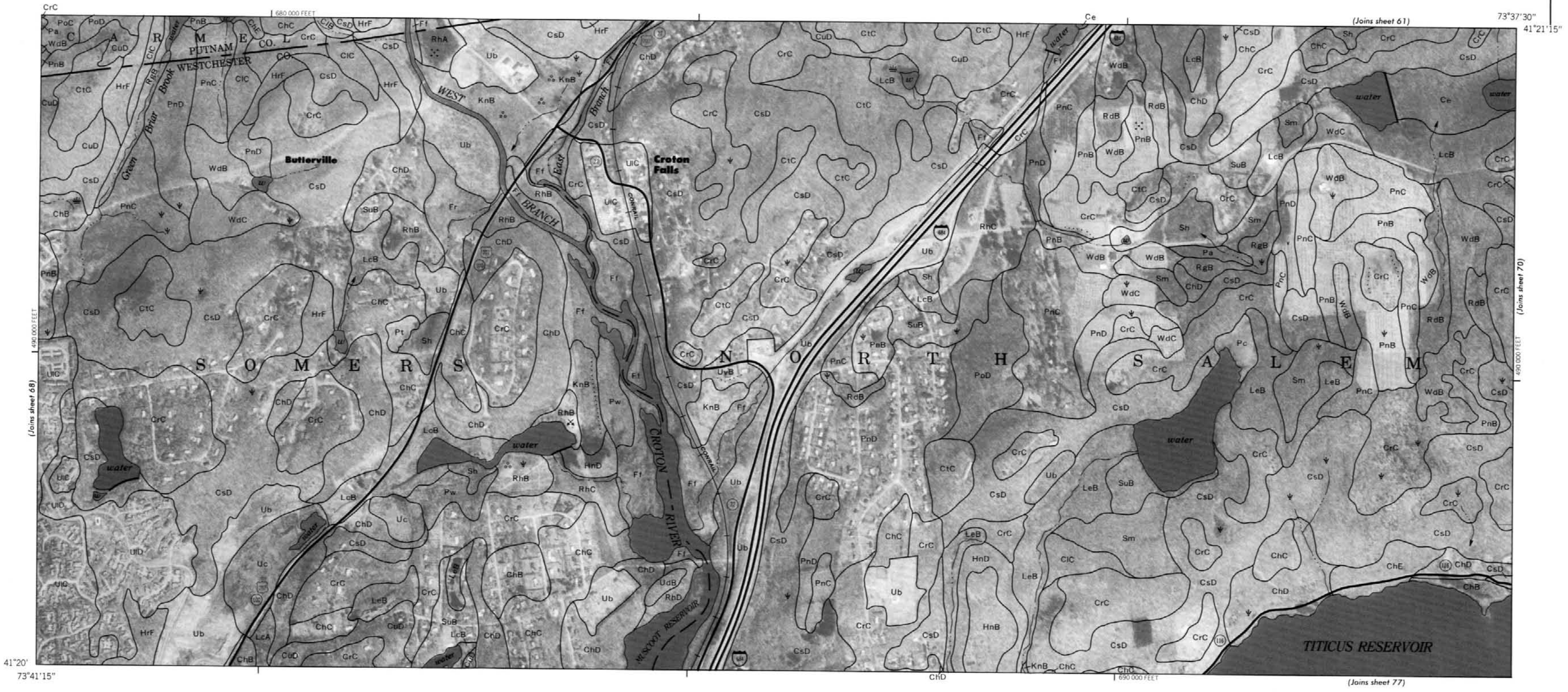
1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 68

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

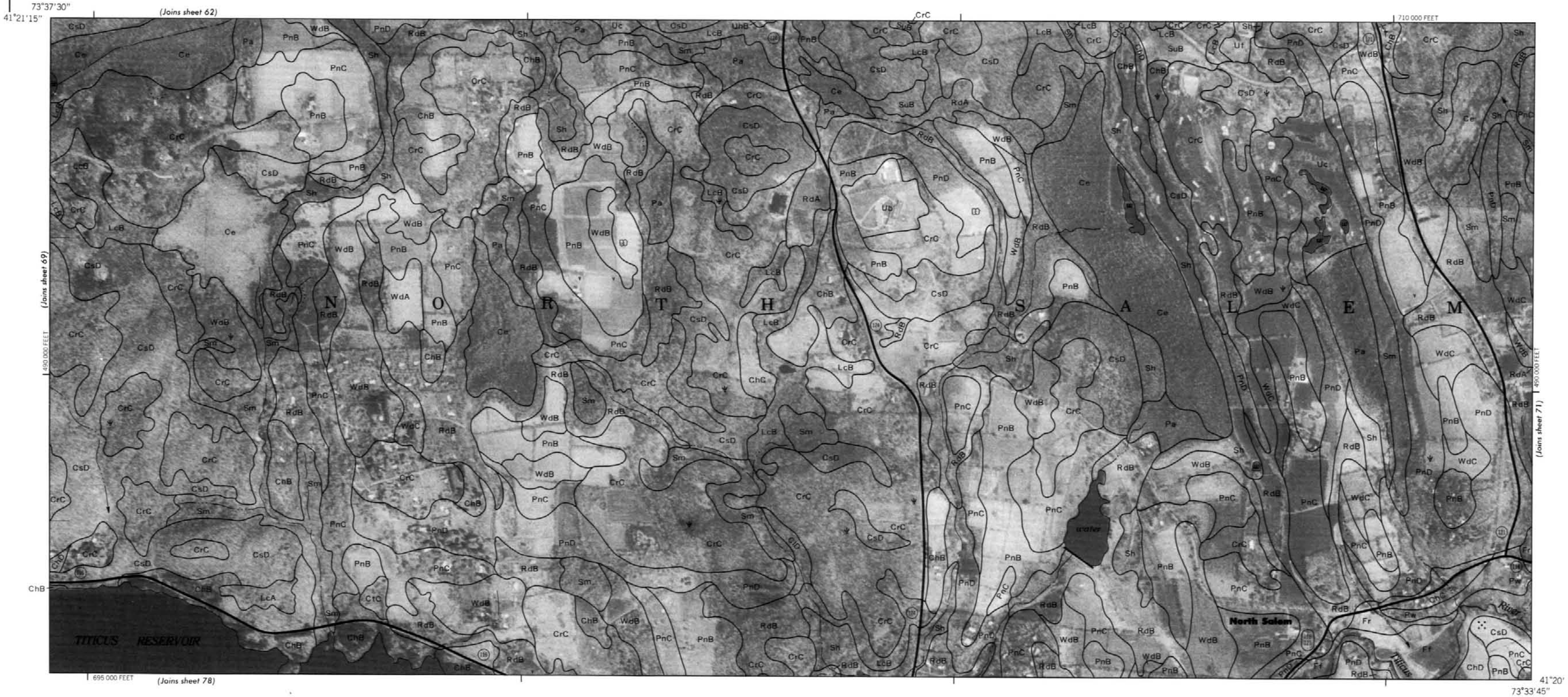
PUTNAM & WESTCHESTER COS., NEW YORK NO. 69

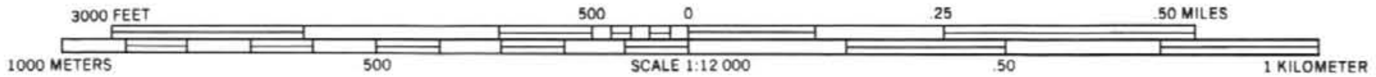


3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

SOIL SURVEY OF PUTNAM AND WESTCHESTER COUNTIES, NEW YORK — SHEET NUMBER 70





PUTNAM & WESTCHESTER COS., NEW YORK NO. 70

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

71

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

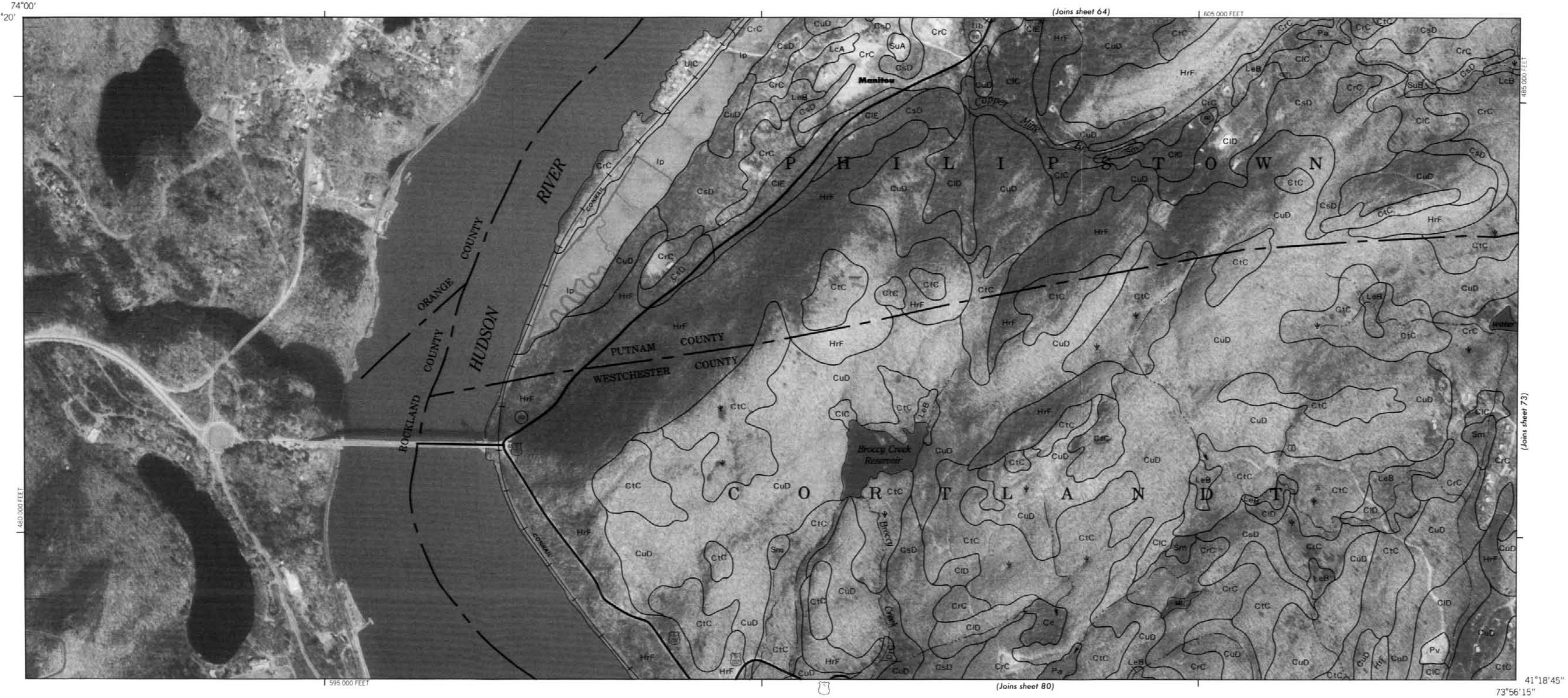
PUTNAM & WESTCHESTER COS., NEW YORK NO. 71

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

72

N



3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 72

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

73

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 73

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

(74)

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS, NEW YORK NO. 74

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

75

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 75

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

76

N

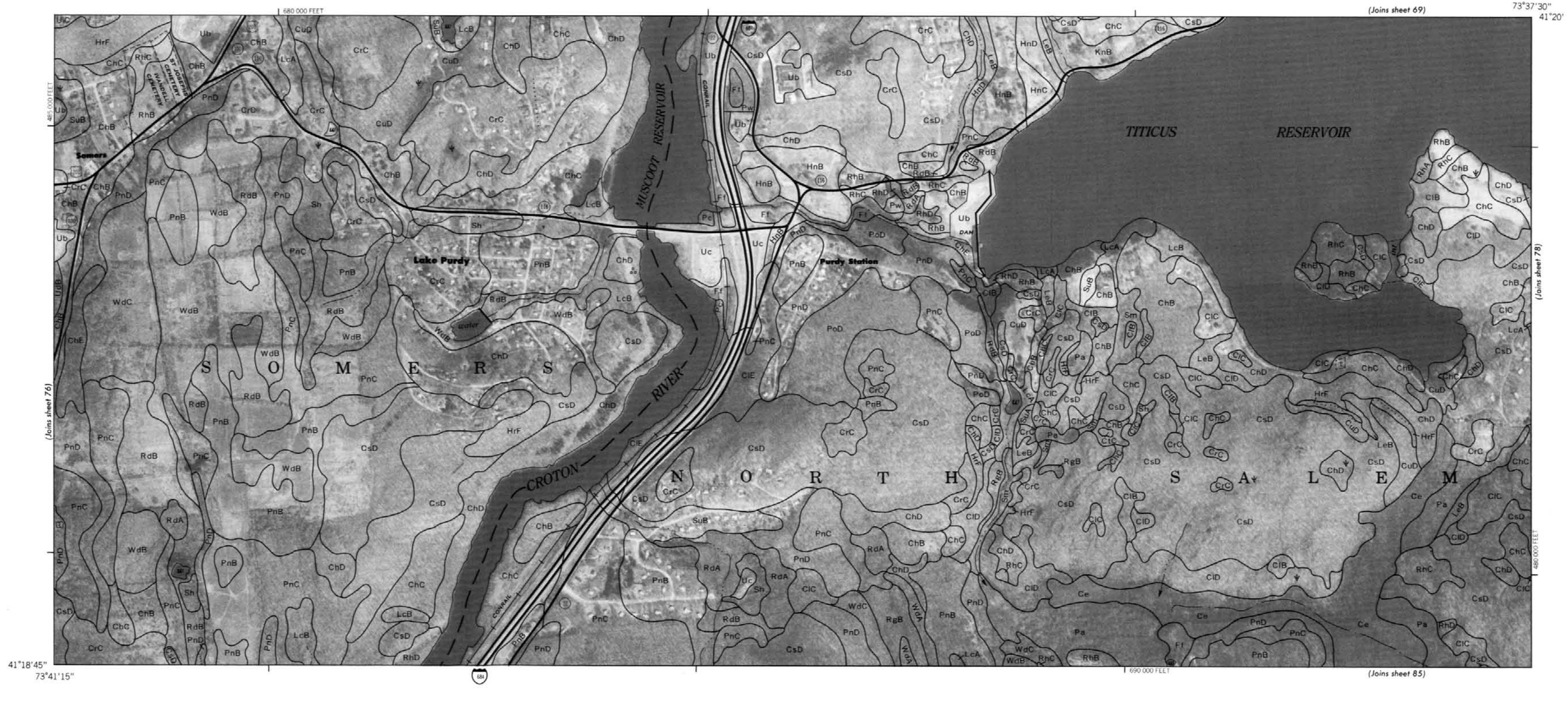
3000 FEET 500 0 25 50 MILES
1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 76

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 77



3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

78

N

PUTNAM & WESTCHESTER COS., NEW YORK NO. 78

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

79

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 79

3000 FEET 500 0 25 50 MILES

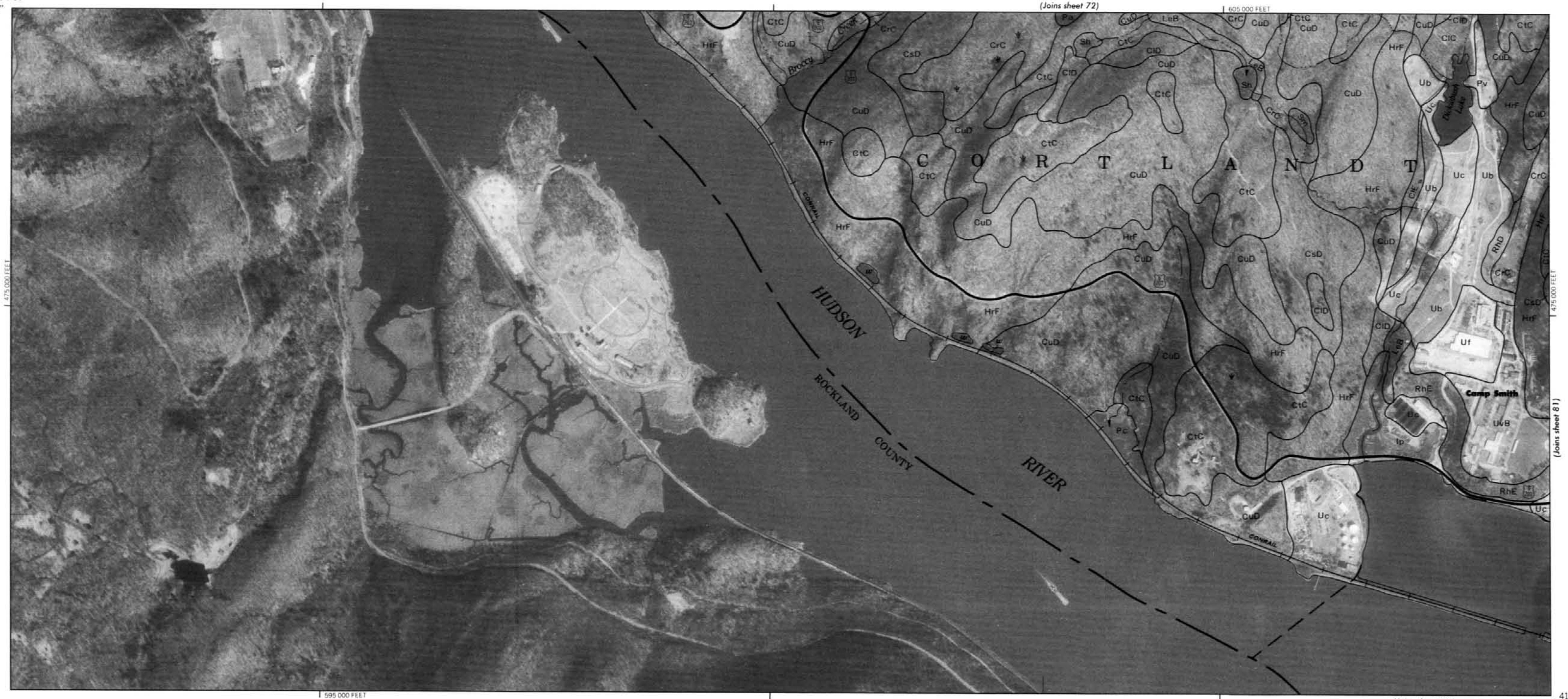
1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

80

N

74°00'
41°18'45"

(Joins sheet 72)



(Joins sheet 81)

(Joins sheet 88)

41°17'30"
73°56'15"

3000 FEET 500 0 .25 .50 MILES
1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 80

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

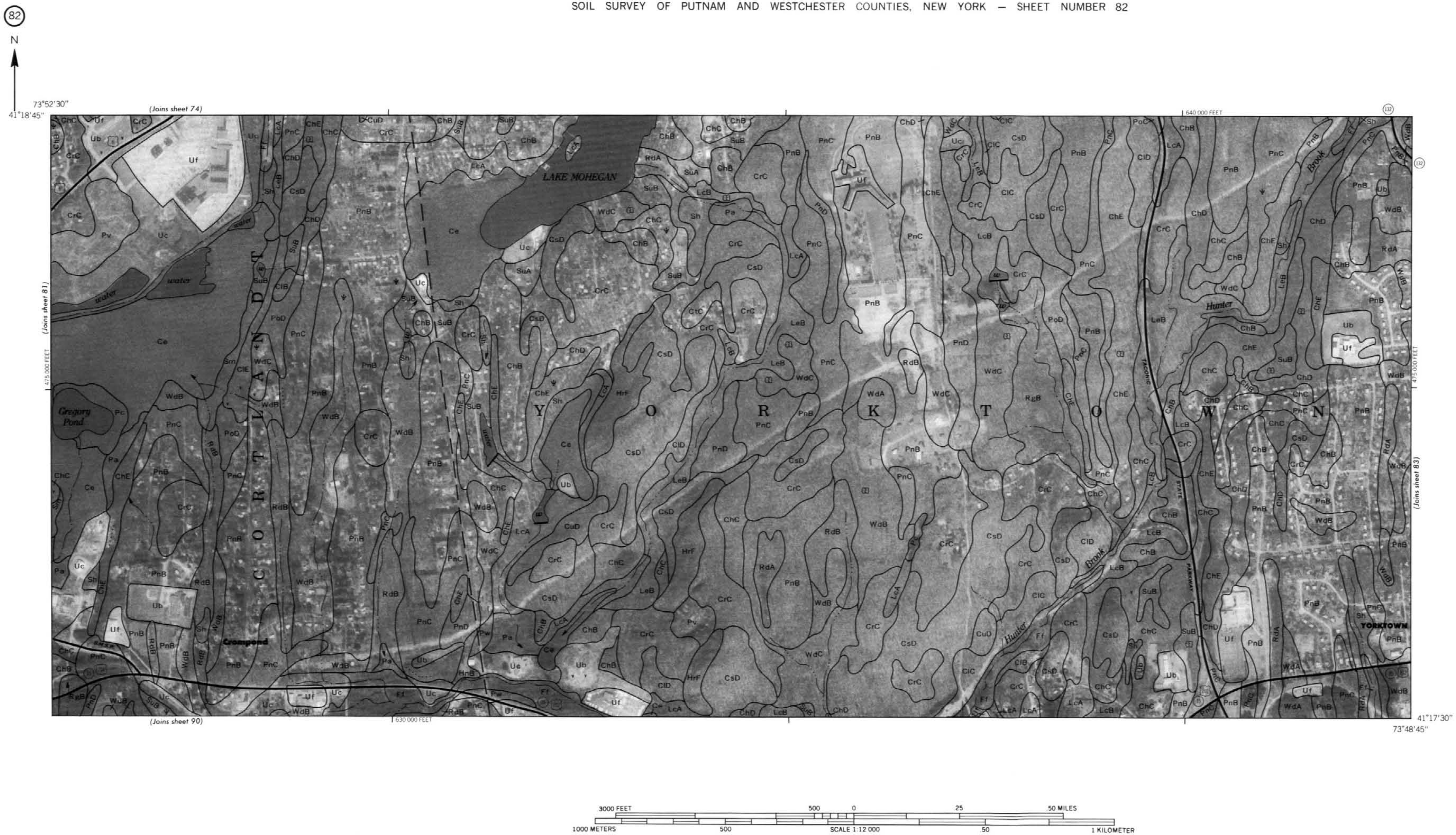
N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 81

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER



PUTNAM & WESTCHESTER COS., NEW YORK NO. 82

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

83

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 83

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 84

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

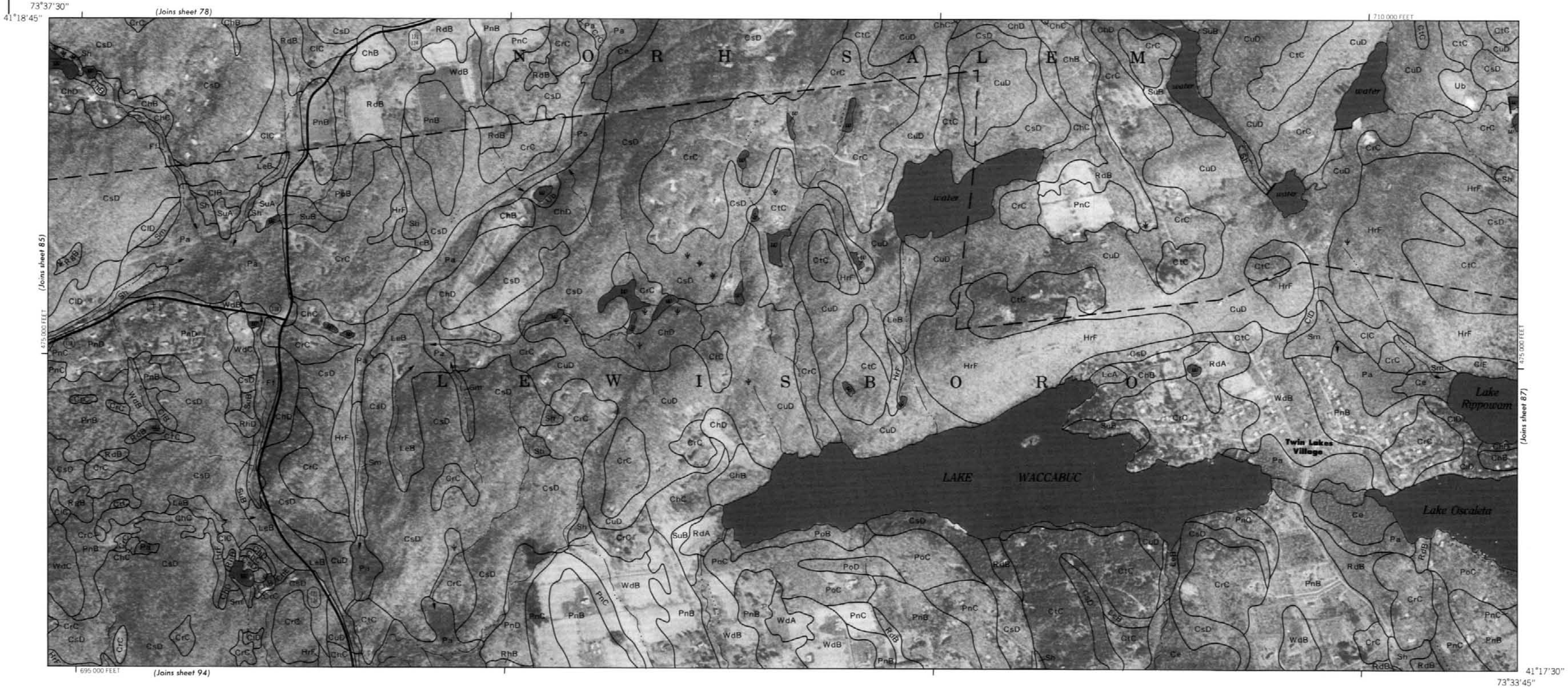
PUTNAM & WESTCHESTER COS., NEW YORK NO. 85

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

86

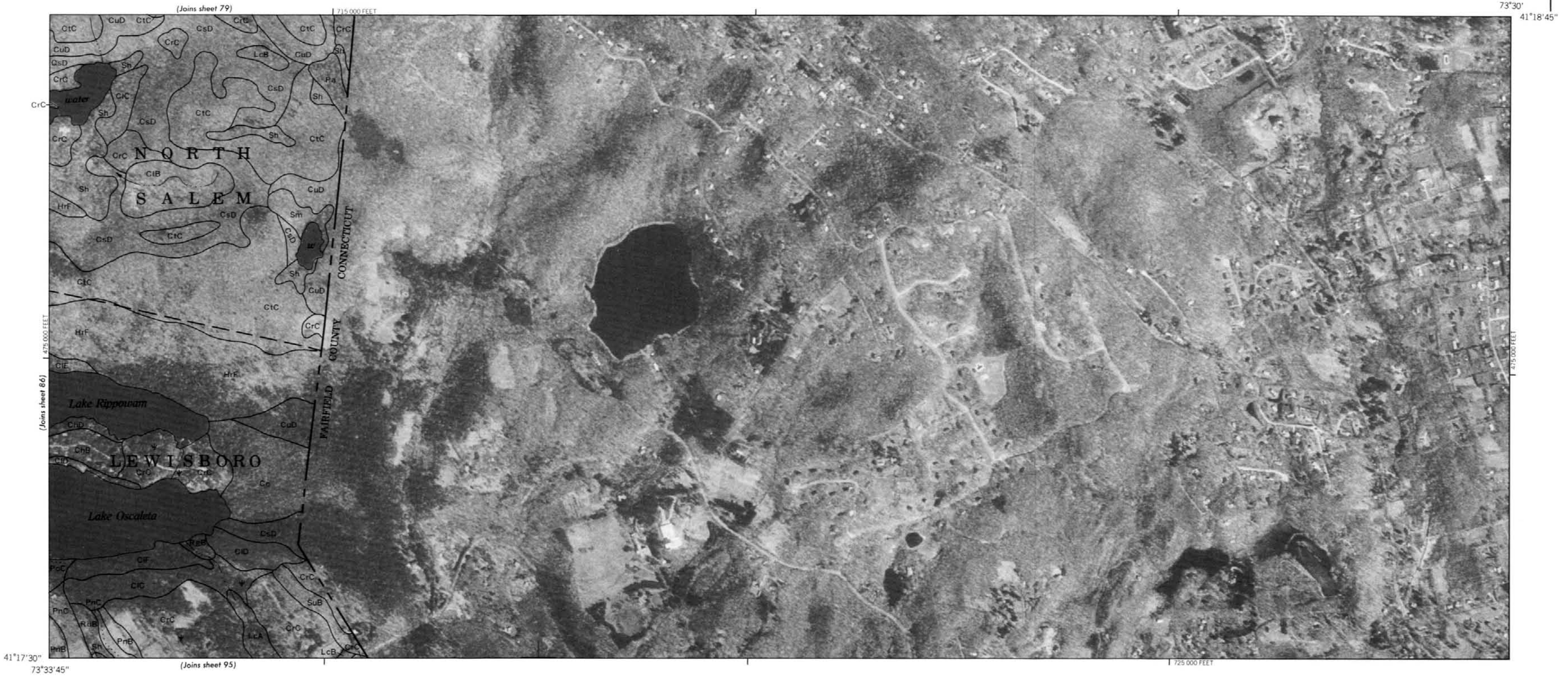
N



3000 FEET 500 0 25 50 MILES
1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

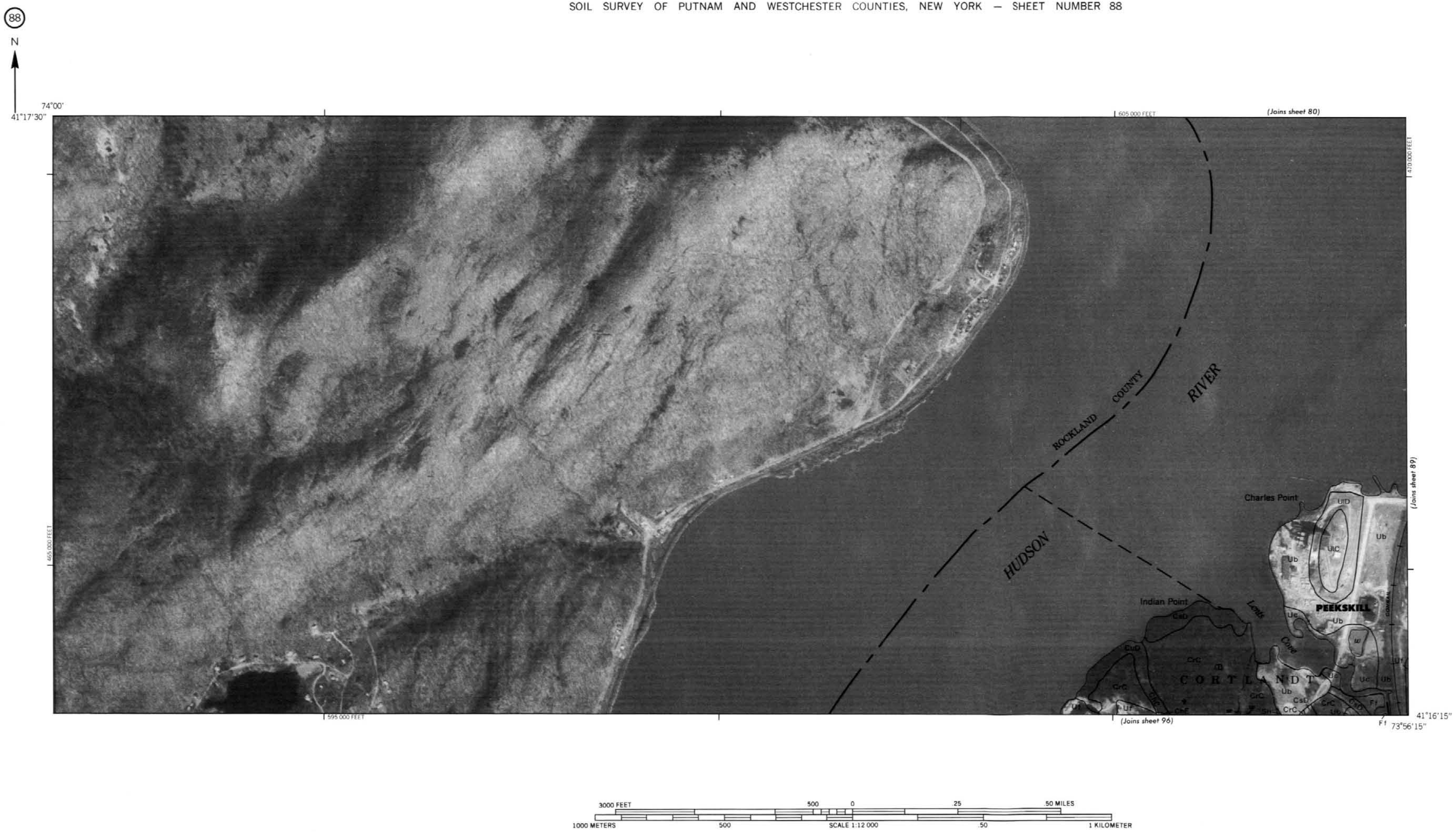
PUTNAM & WESTCHESTER COS., NEW YORK NO. 86
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies.
Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial
photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 87



PUTNAM & WESTCHESTER COS., NEW YORK NO. 88

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 89

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

(90)

N

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 90

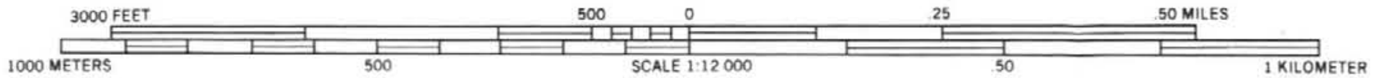
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

91

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies.
Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial
photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.
PUTNAM & WESTCHESTER COS., NEW YORK NO. 91

SOIL SURVEY OF PUTNAM AND WESTCHESTER COUNTIES, NEW YORK — SHEET NUMBER 92



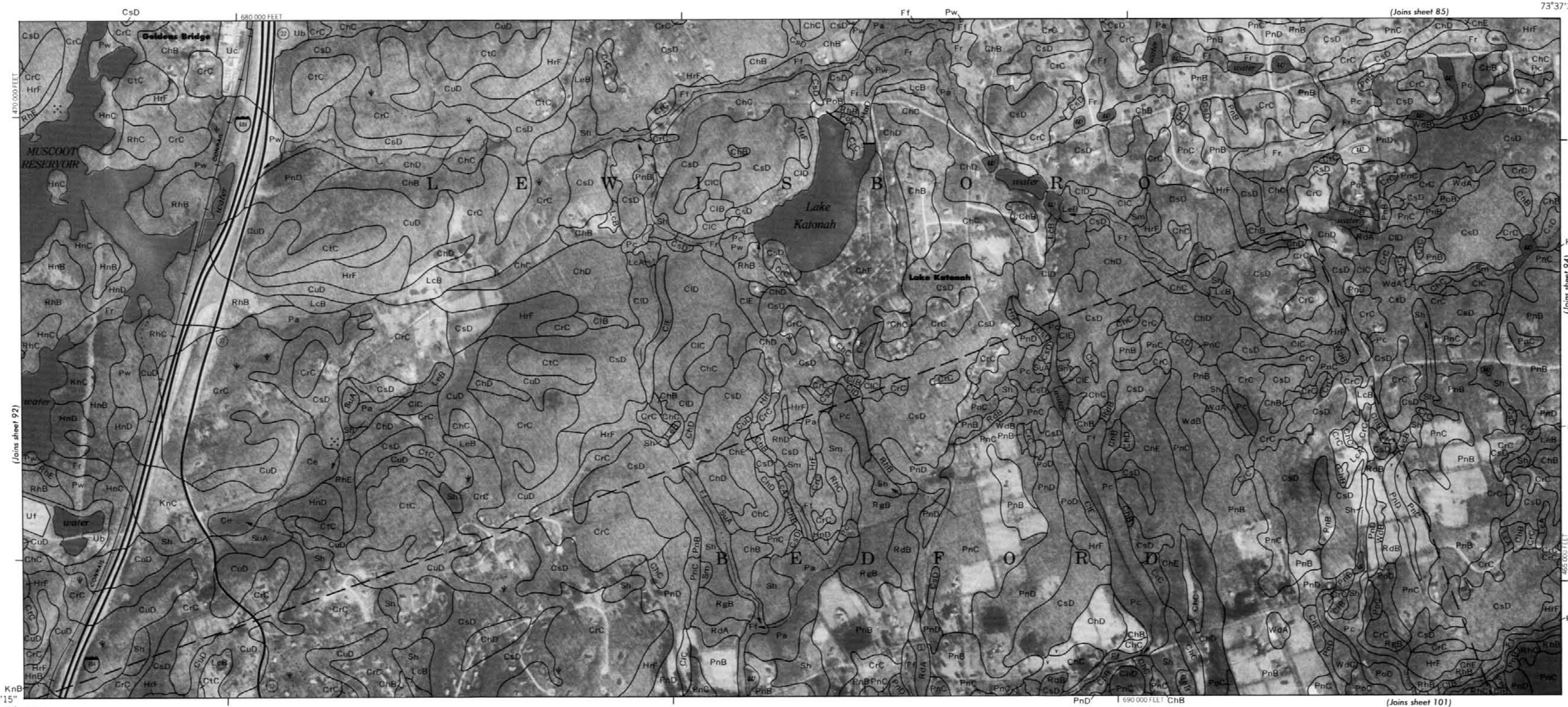
PUTNAM & WESTCHESTER COS., NEW YORK NO. 92

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 93



3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

SOIL SURVEY OF PUTNAM AND WESTCHESTER COUNTIES, NEW YORK — SHEET NUMBER 94

PUTNAM & WESTCHESTER COS., NEW YORK NO. 94

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

95

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 95

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

3000 FEET 500 0 25 50 MILES

1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

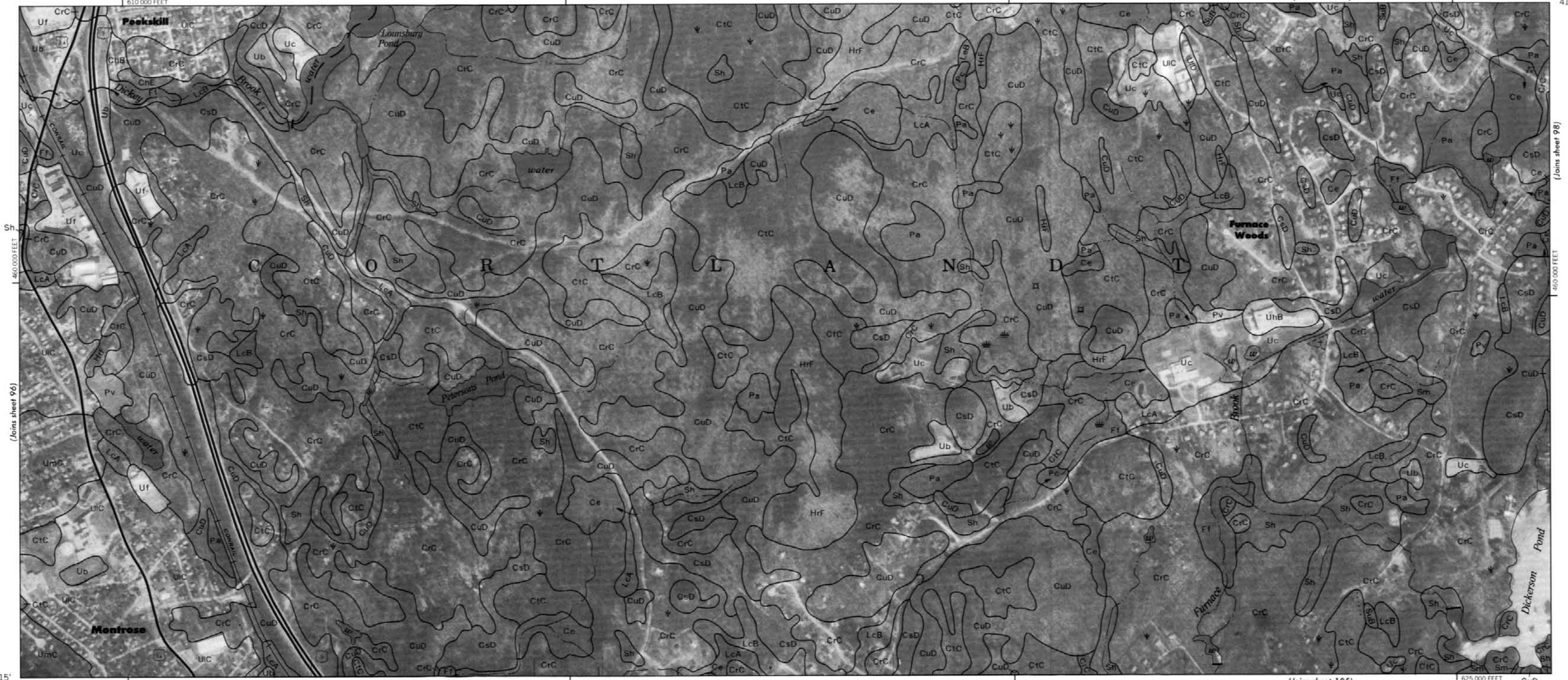
PUTNAM & WESTCHESTER COS., NEW YORK NO. 96

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

97

N

73°52'30"
41°16'15"



41°15'
73°56'15"

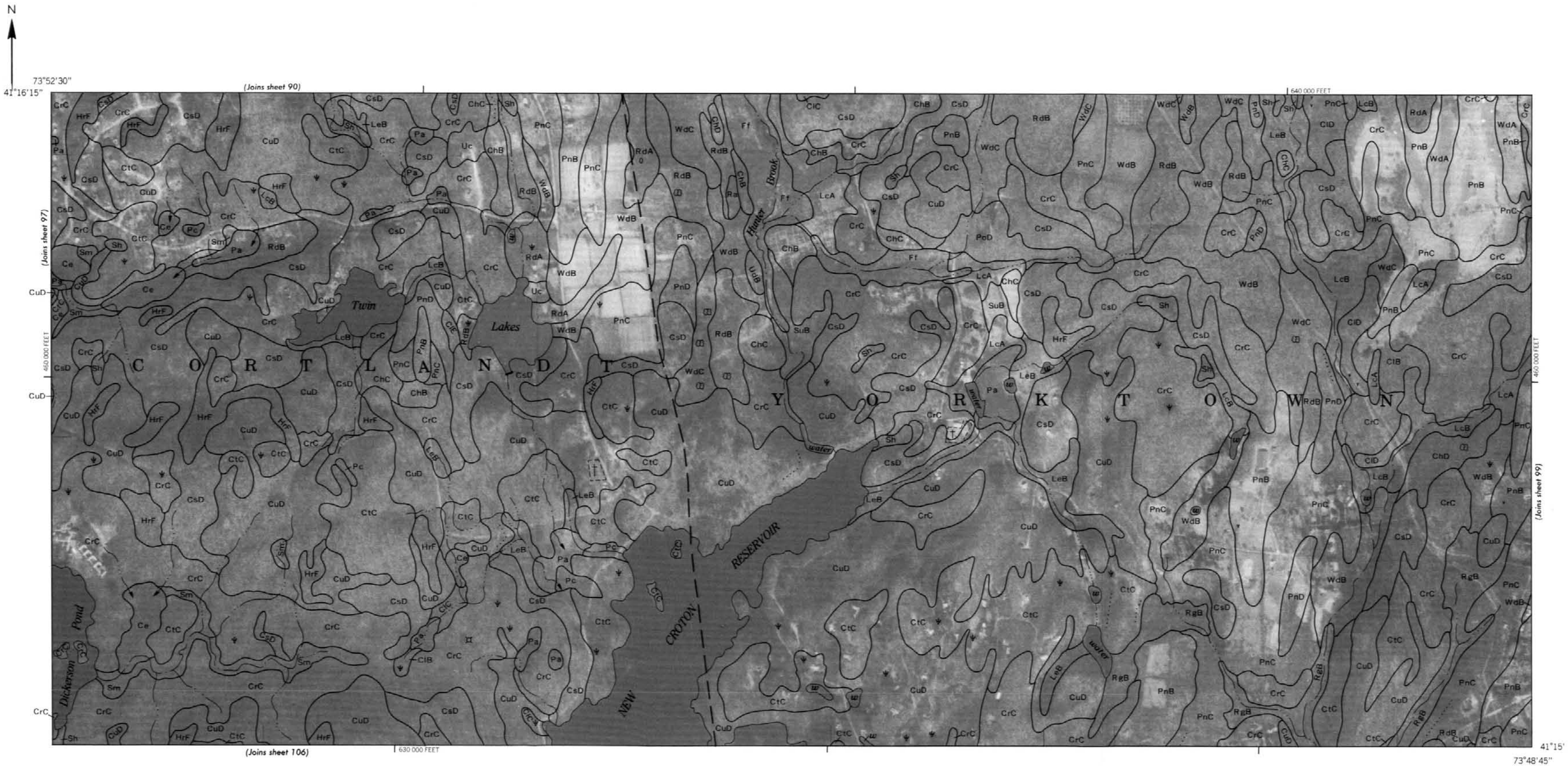
3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 97

98



3000 FEET 500 0 .25 .50 MILES
1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS, NEW YORK NO. 98

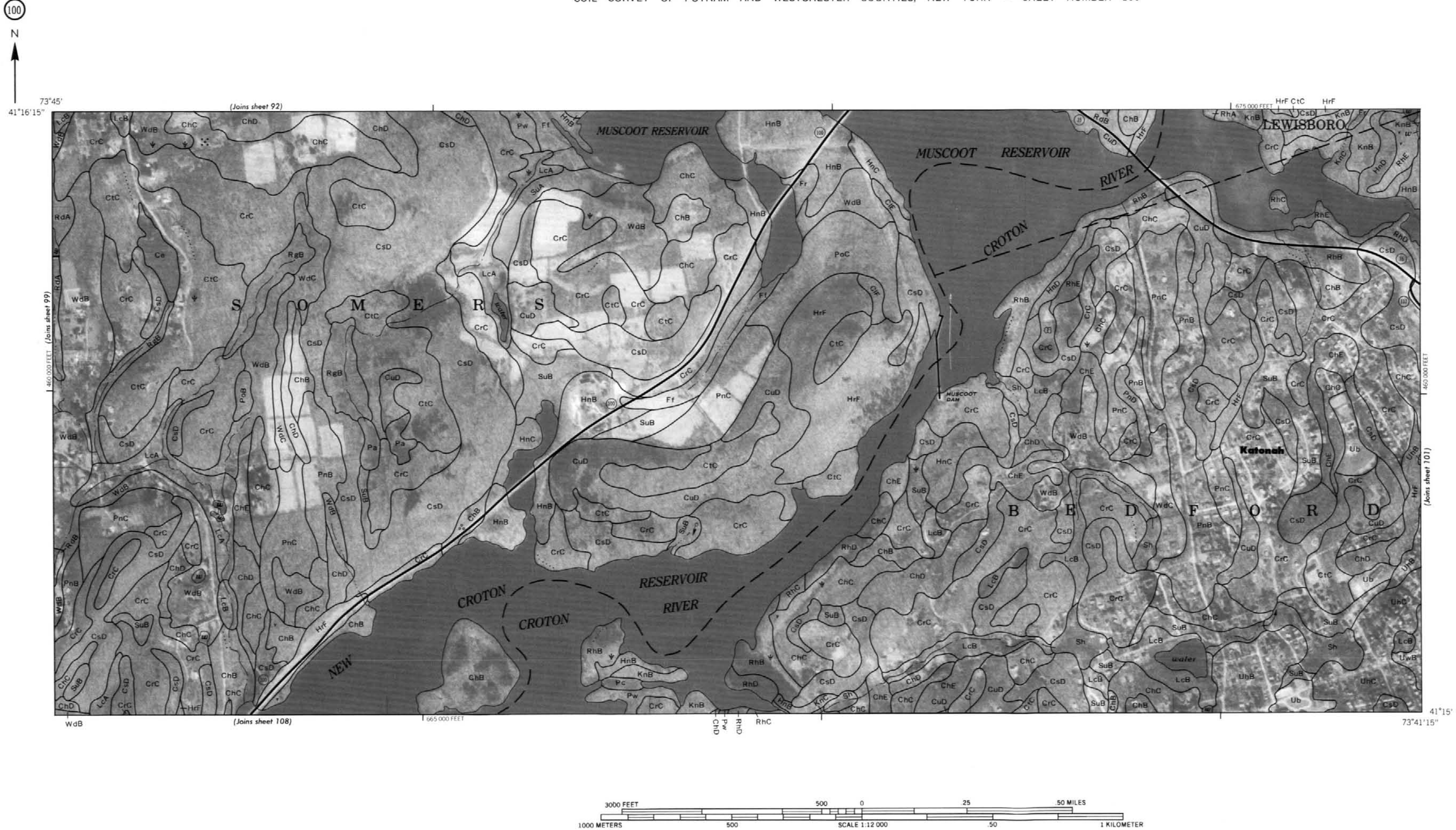
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

99

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.
PUTNAM & WESTCHESTER COS., NEW YORK NO. 99

3000 FEET 500 0 .25 .50 MILES
1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

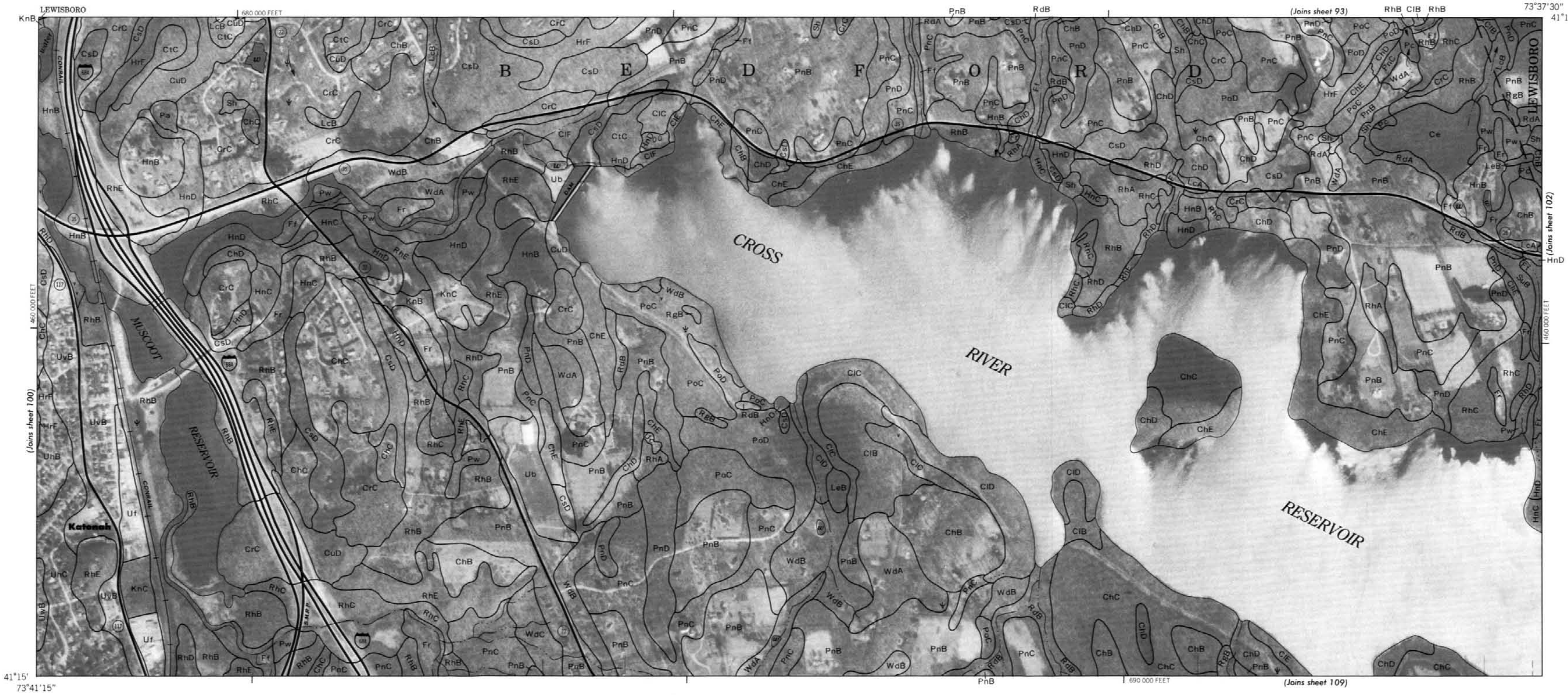


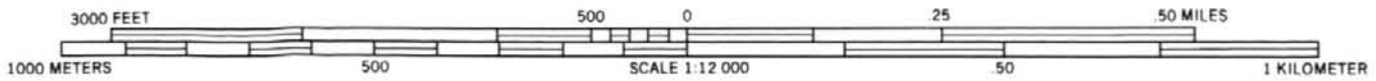
PUTNAM & WESTCHESTER COS., NEW YORK NO. 100

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

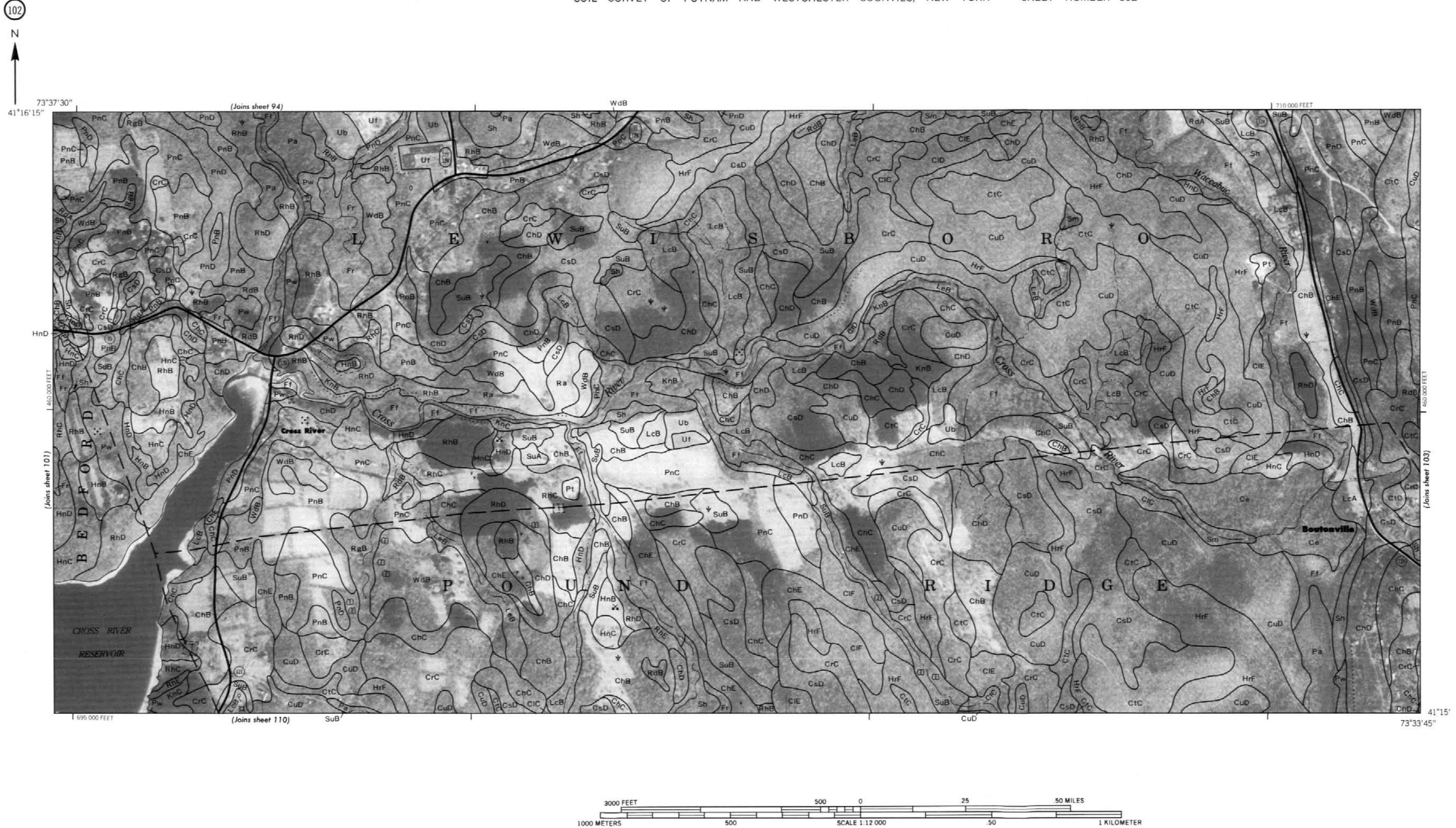
N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies.
Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial
photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.
PUTNAM & WESTCHESTER COS., NEW YORK NO. 101





SOIL SURVEY OF PUTNAM AND WESTCHESTER COUNTIES, NEW YORK — SHEET NUMBER 102



PUTNAM & WESTCHESTER COS., NEW YORK NO. 102

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

103

N

3000 FEET 500 0 25 50 MILES

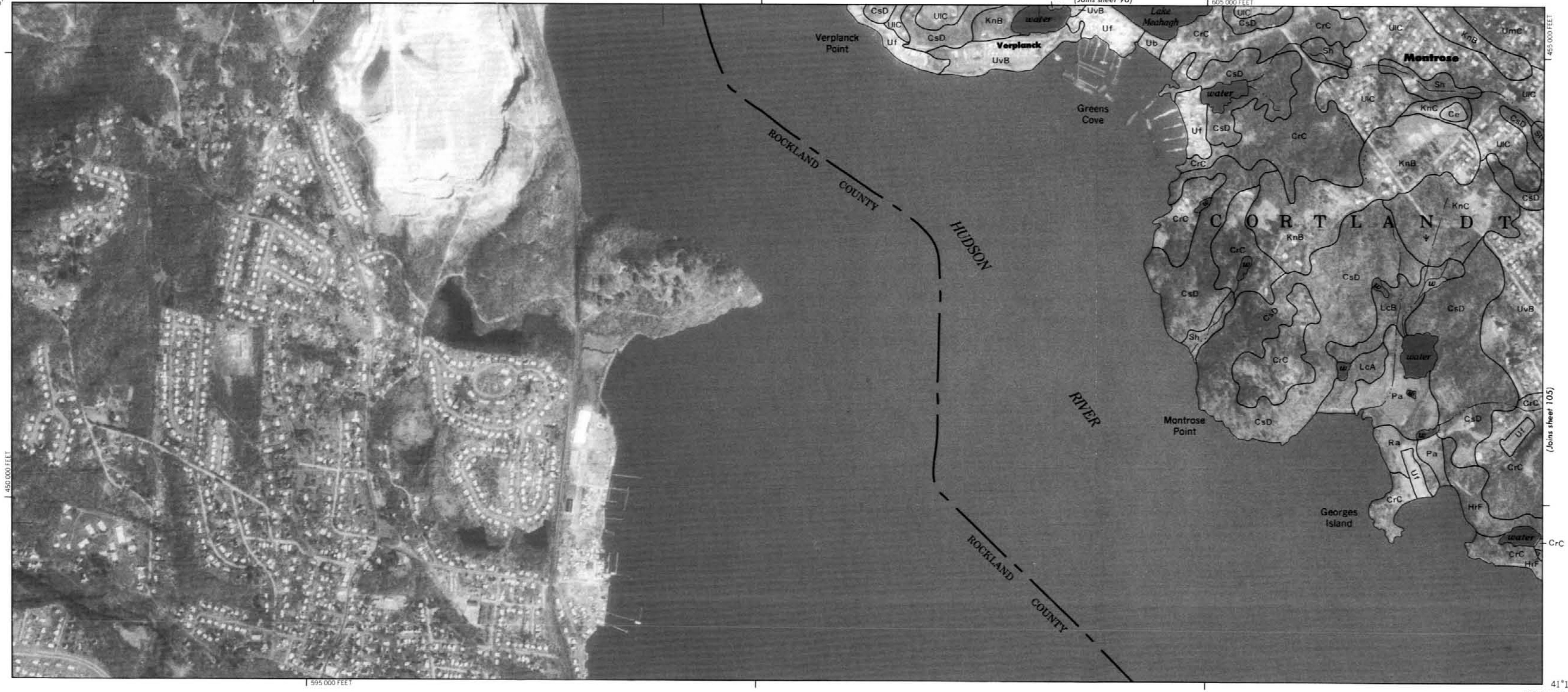
1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies.
Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 103

104

N



3000 FEET 500 0 25 50 MILES
1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

PUTNAM & WESTCHESTER COS, NEW YORK NO. 104

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

105

N

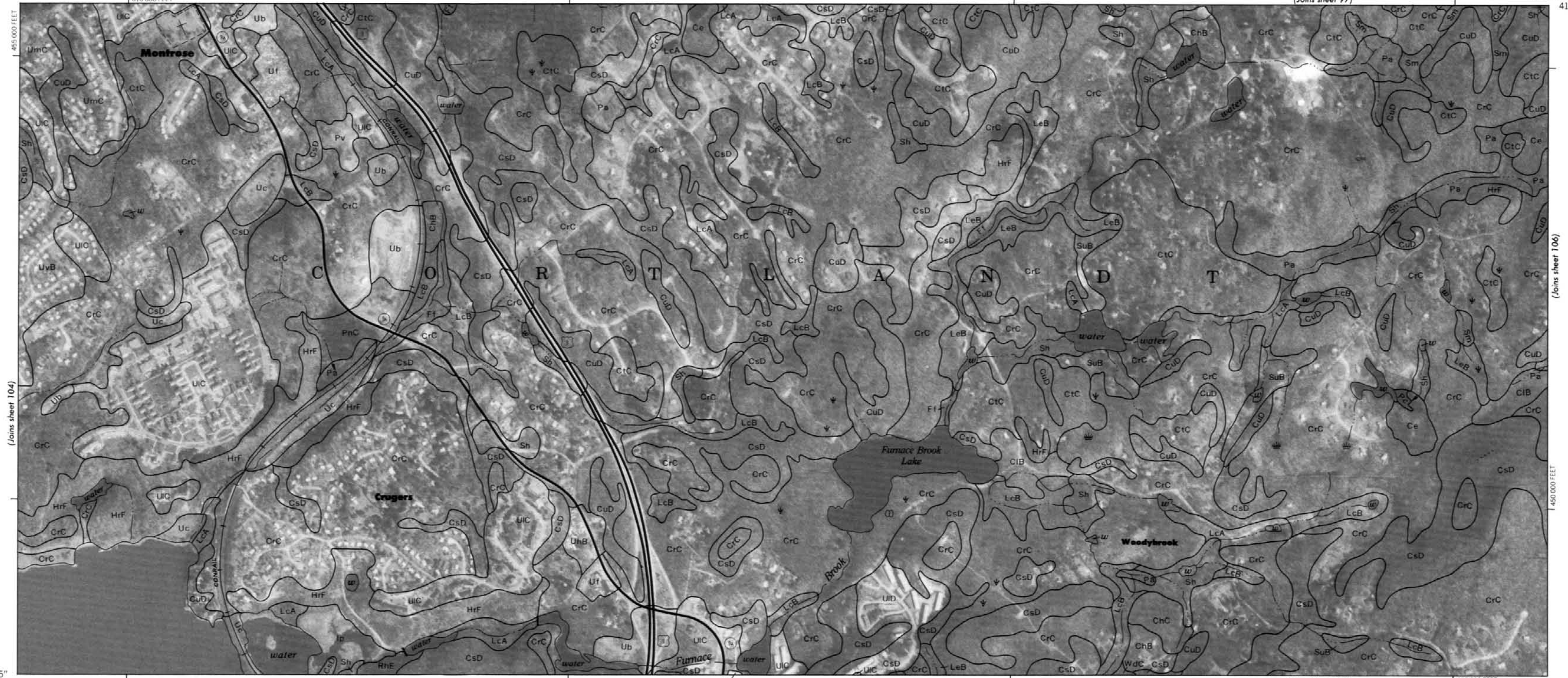
(Joins sheet 97)

73°52'30"

41°15'

610 000 FEET

455 000 FEET



(Joins sheet 104)

(Joins sheet 106)

450 000 FEET

41°13'45"

73°56'15"

(Joins sheet 112)

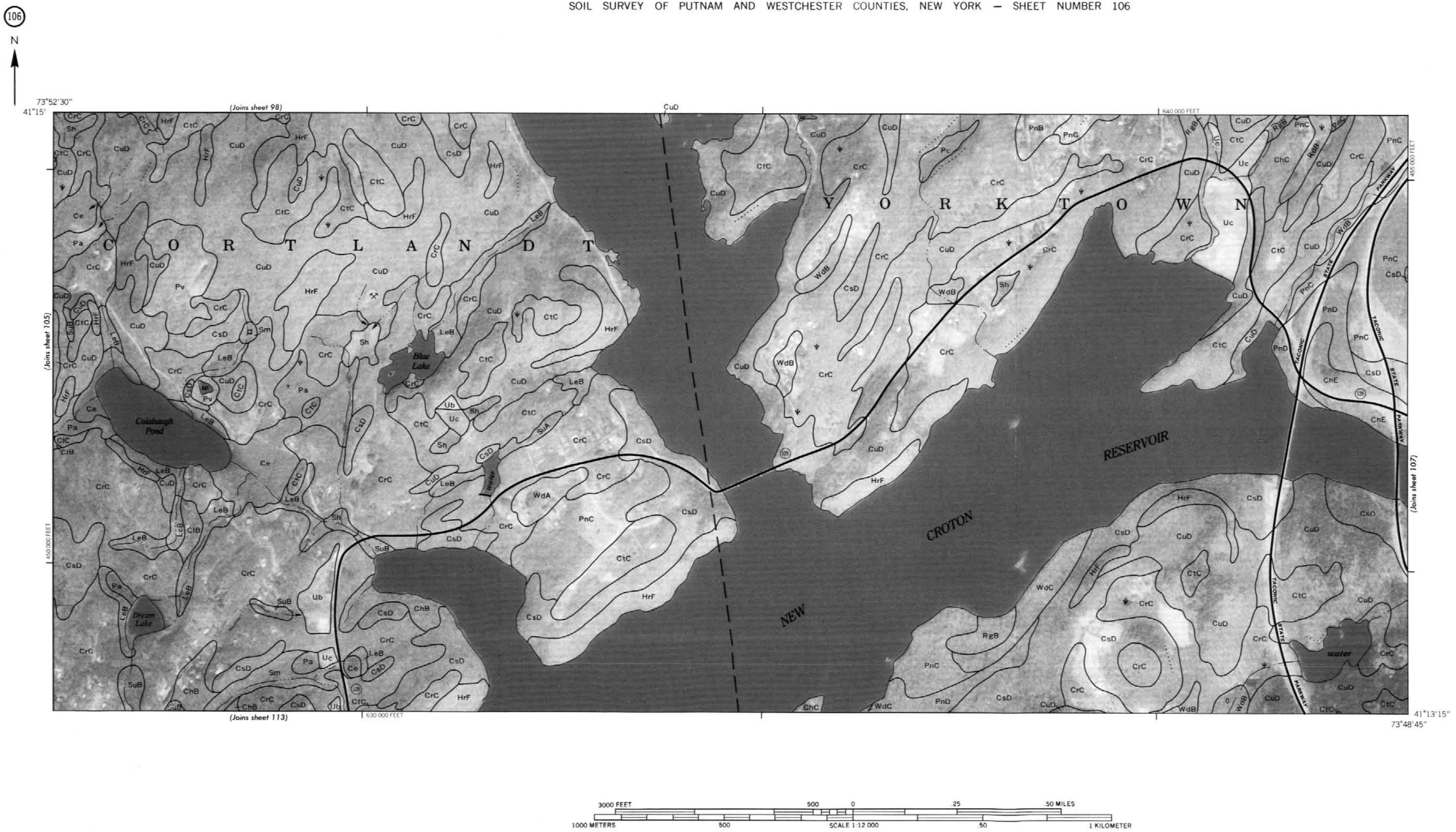
625 000 FEET

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 105



PUTNAM & WESTCHESTER COS., NEW YORK NO. 106

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

107

N

3000 FEET 500 0 .25 .50 MILES
1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

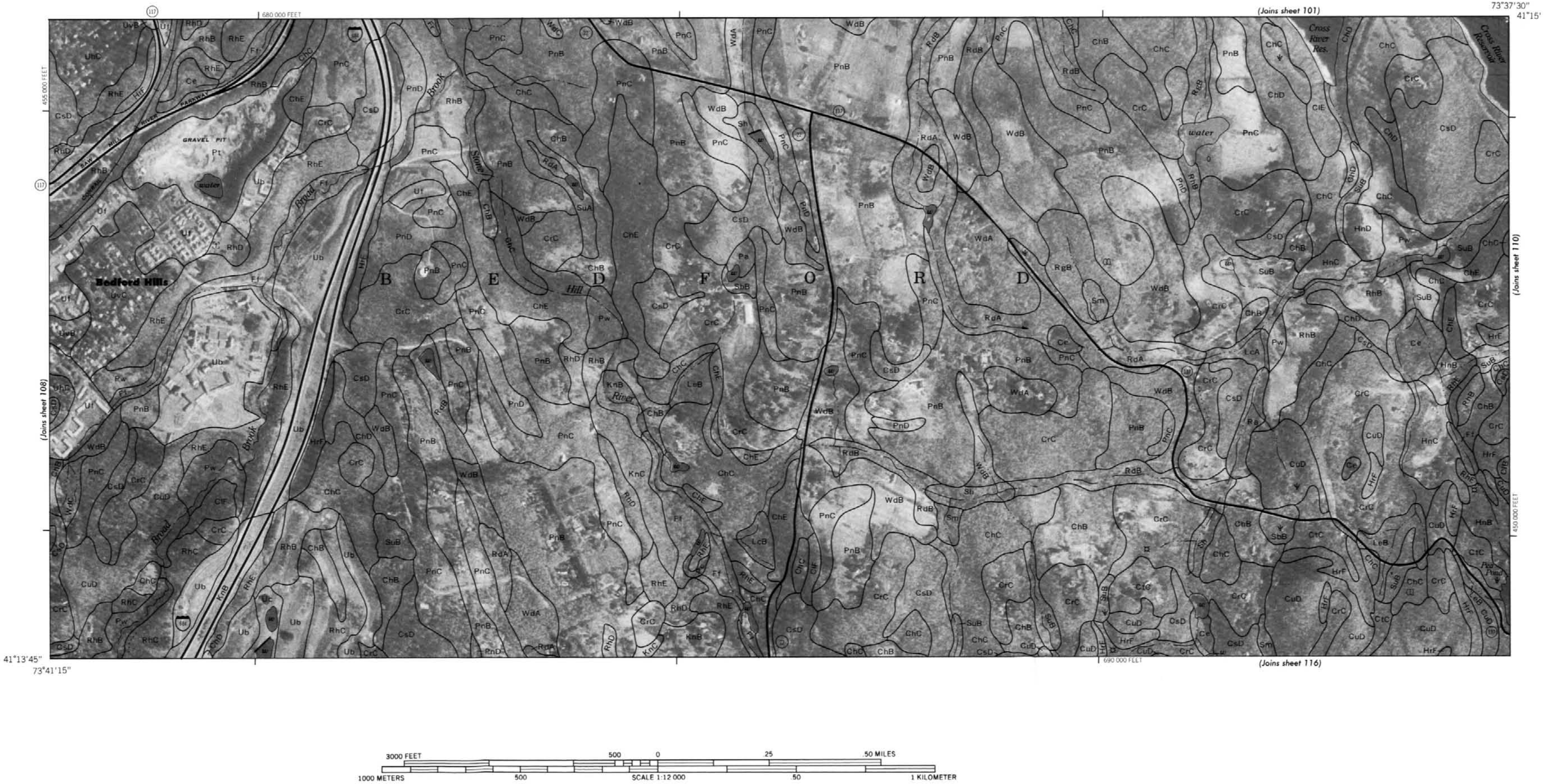
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 107

PUTNAM & WESTCHESTER COS., NEW YORK NO. 108

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

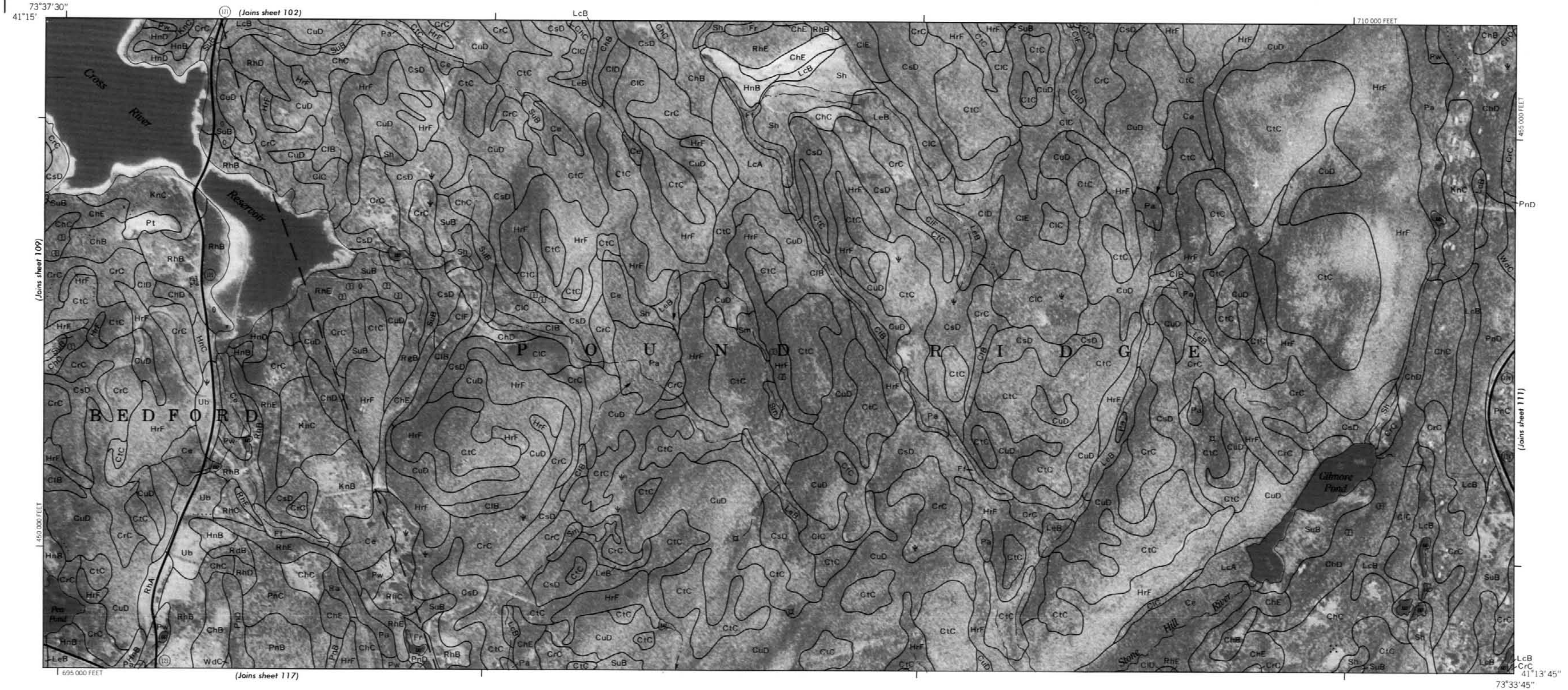


This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 109

110

N



3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 110

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

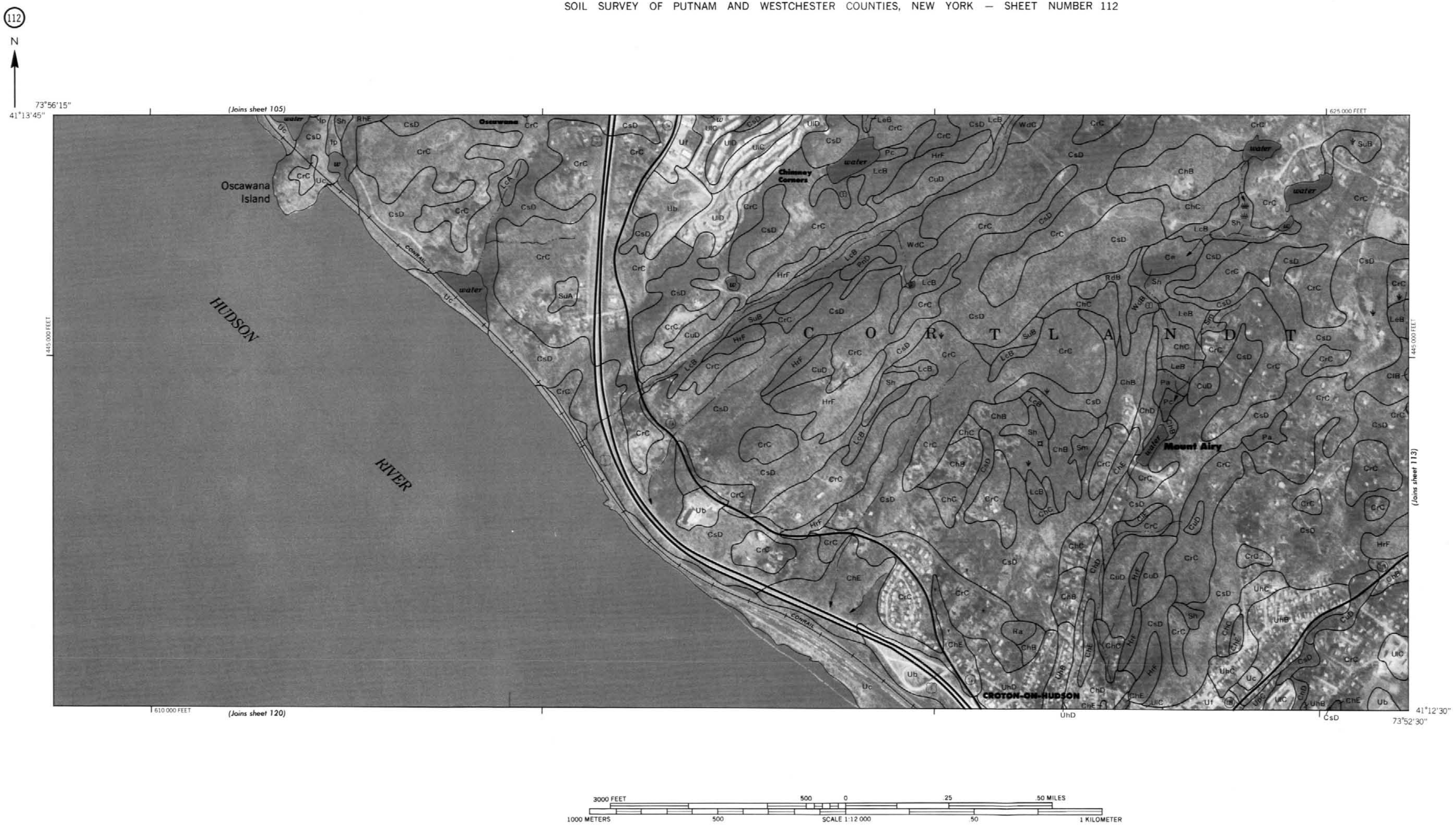
111

N

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



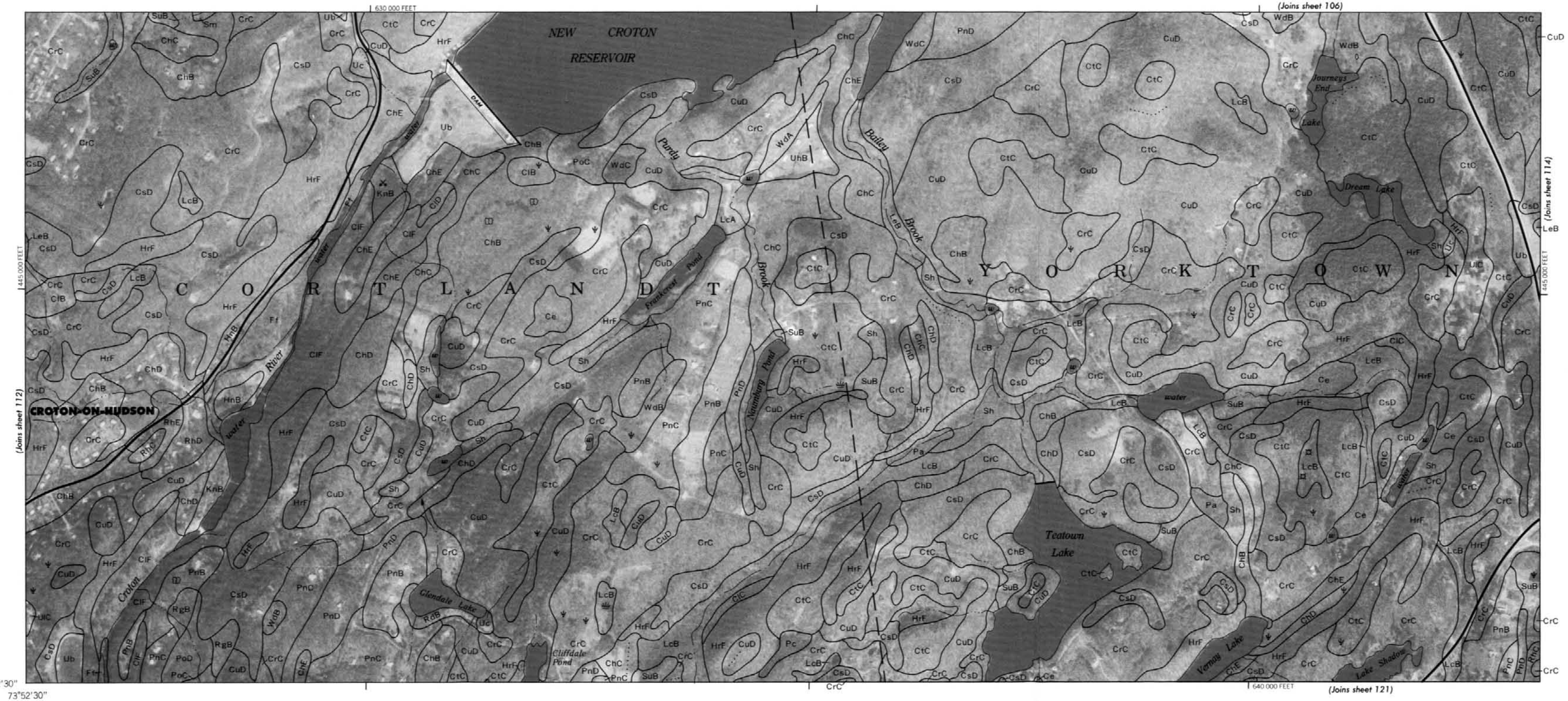
PUTNAM & WESTCHESTER COS., NEW YORK NO. 112

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

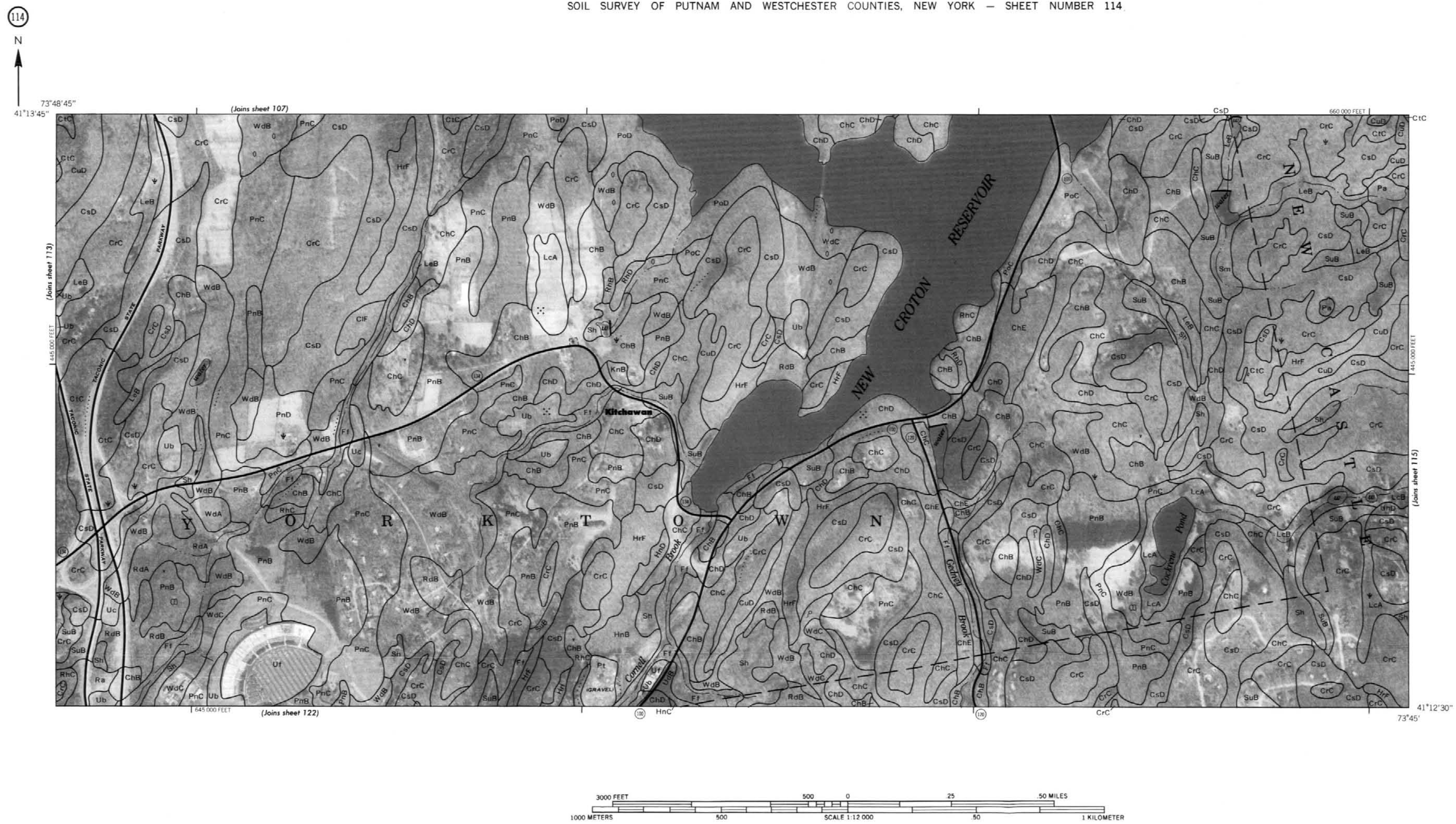
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 113



3000 FEET 500 0 25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER



PUTNAM & WESTCHESTER COS., NEW YORK NO. 114

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

115

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 115

3000 FEET 500 0 25 .50 MILES
1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 116

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

117

N

73°33'45"
41°13'45"

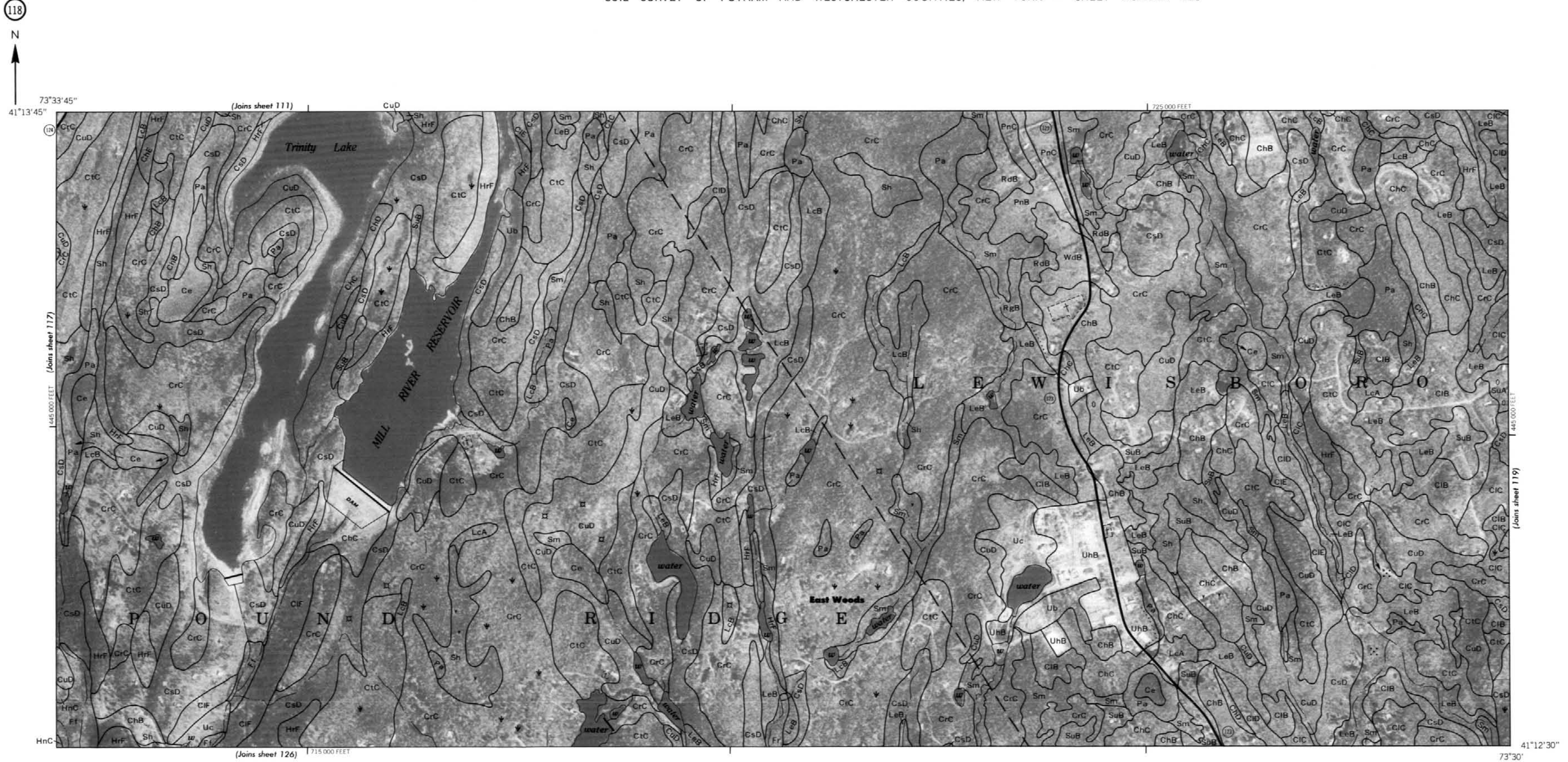
41°12'30"
73°37'30"

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 117

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER



3000 FEET 500 0 25 50 MILES
1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 118

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

119

N

3000 FEET 500 0 .25 .50 MILES

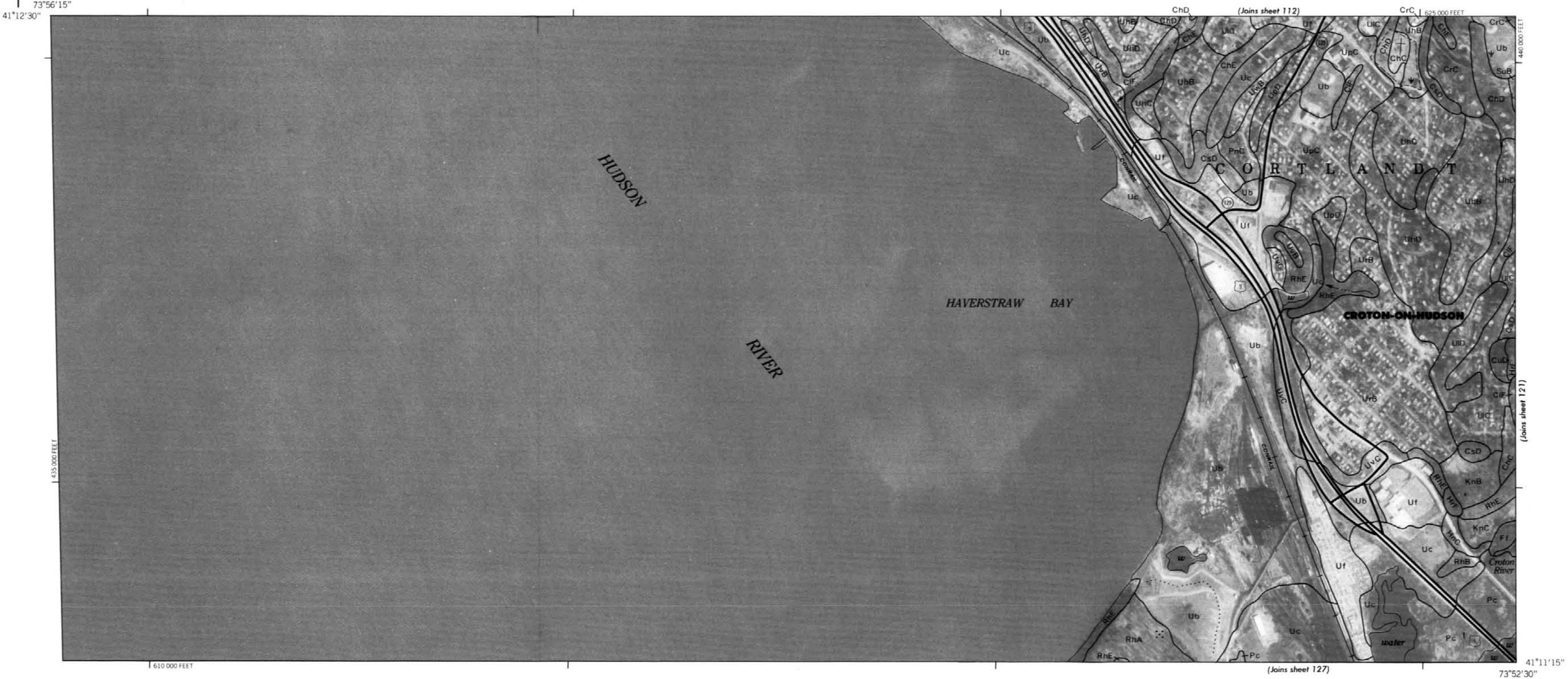
1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 119

120

N



3000 FEET 500 0 .25 .50 MILES

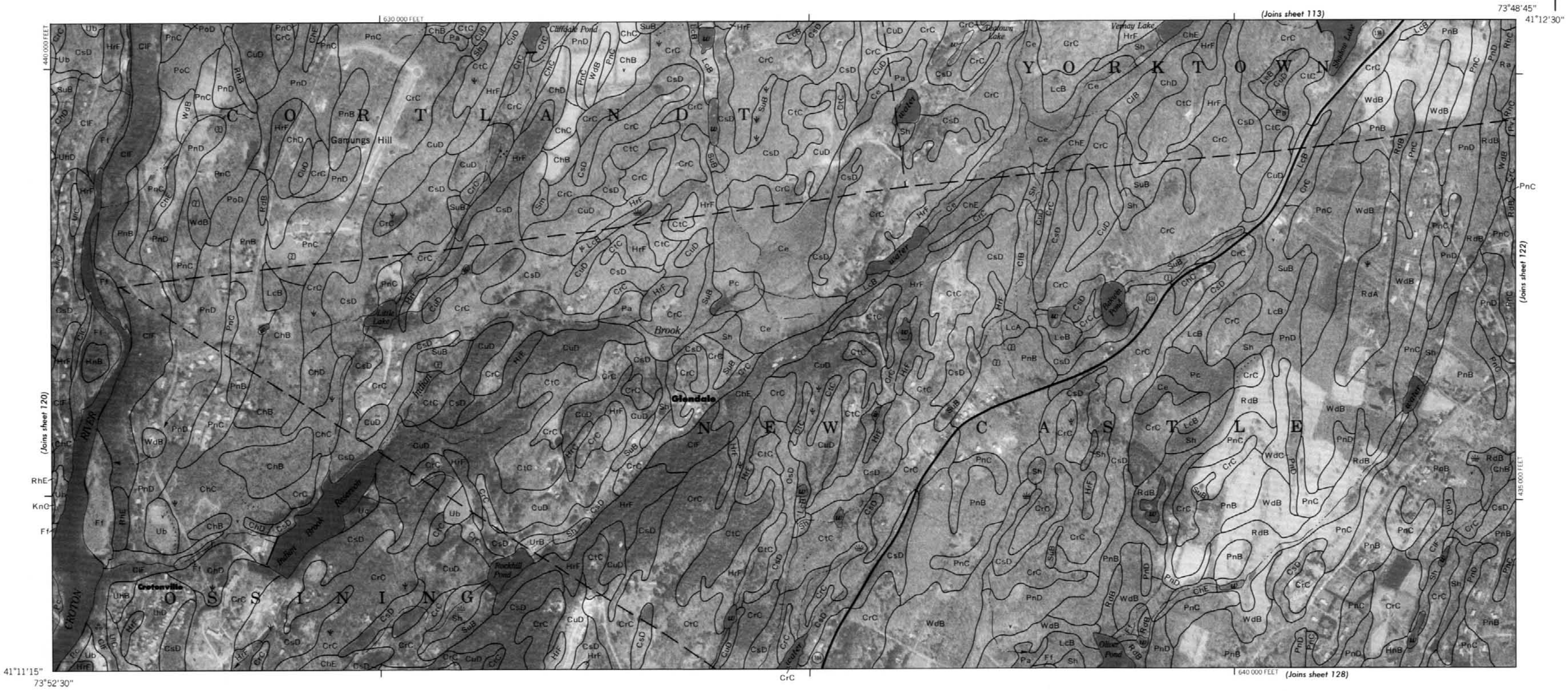
1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 120

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 121



3000 FEET 500 0 25 50 MILES

1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 122

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

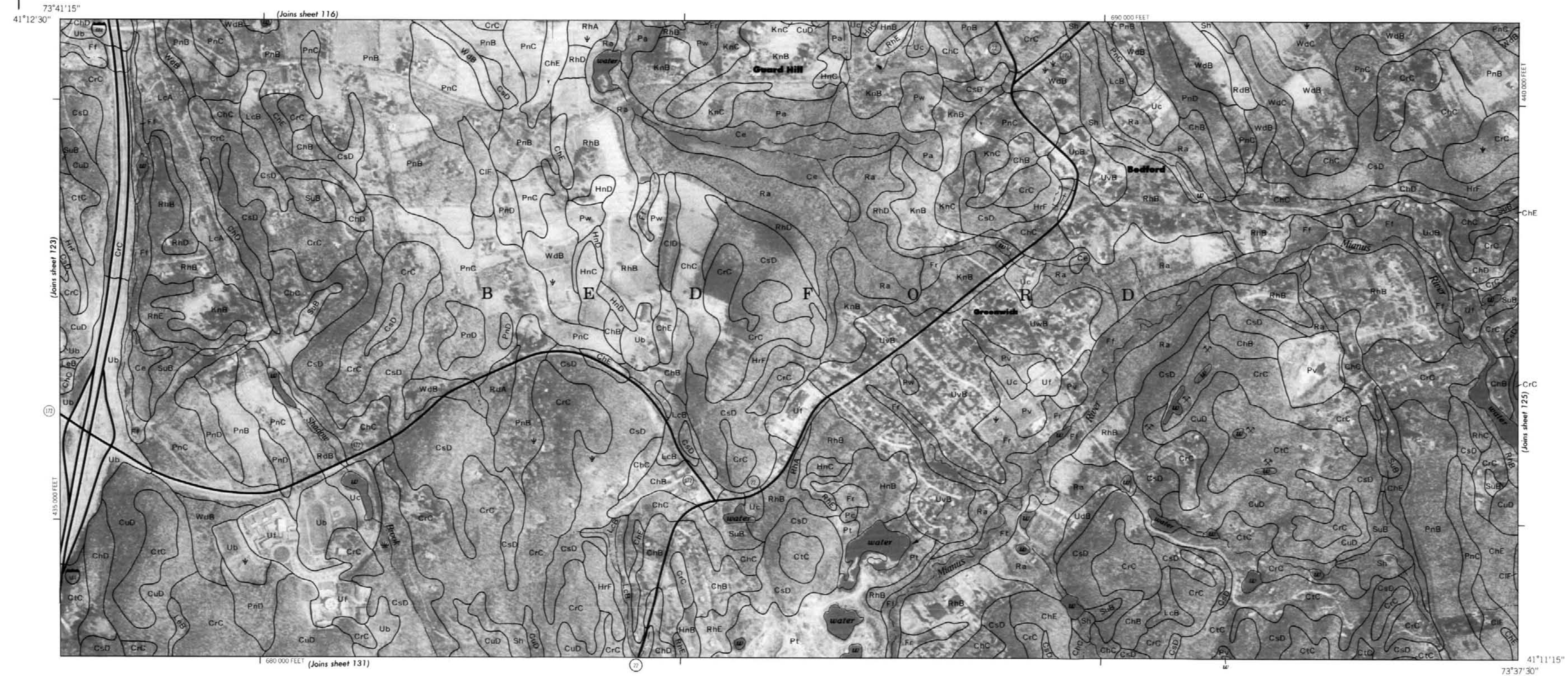
N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies.
Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 123

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER



3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 124

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

125

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 125

3000 FEET 500 0 .25 .50 MILES

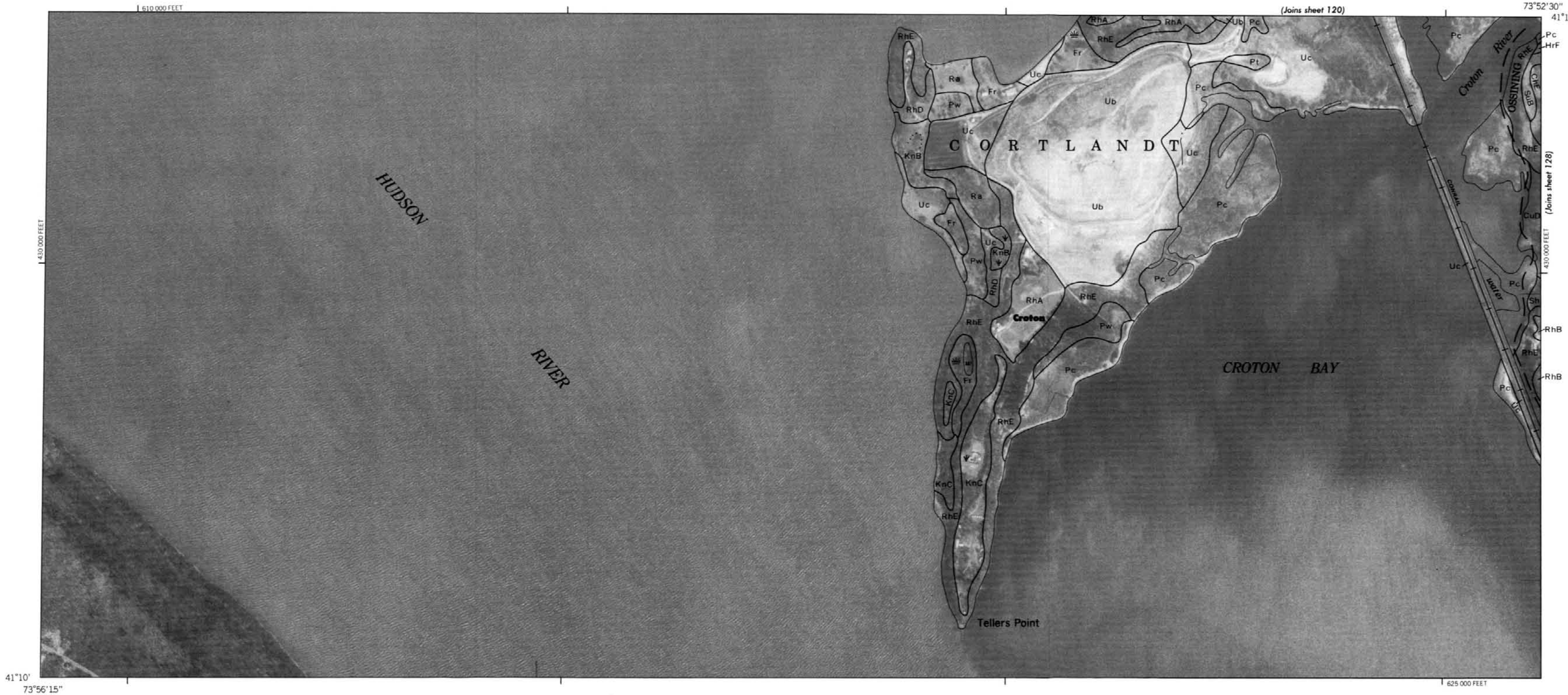
1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 126

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies.
Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial
photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

127

N



3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 127

128

N

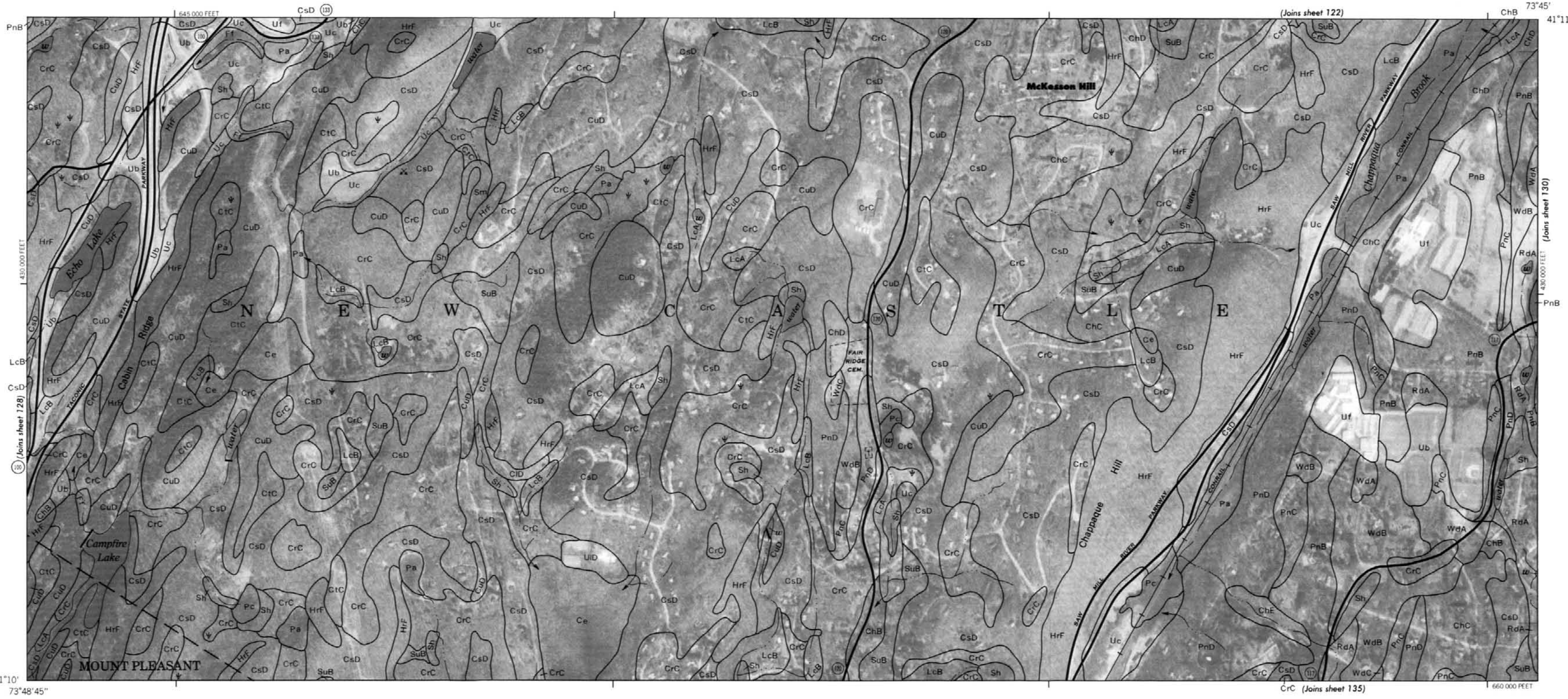
3000 FEET 500 0 .25 .50 MILES
1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 128

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 129

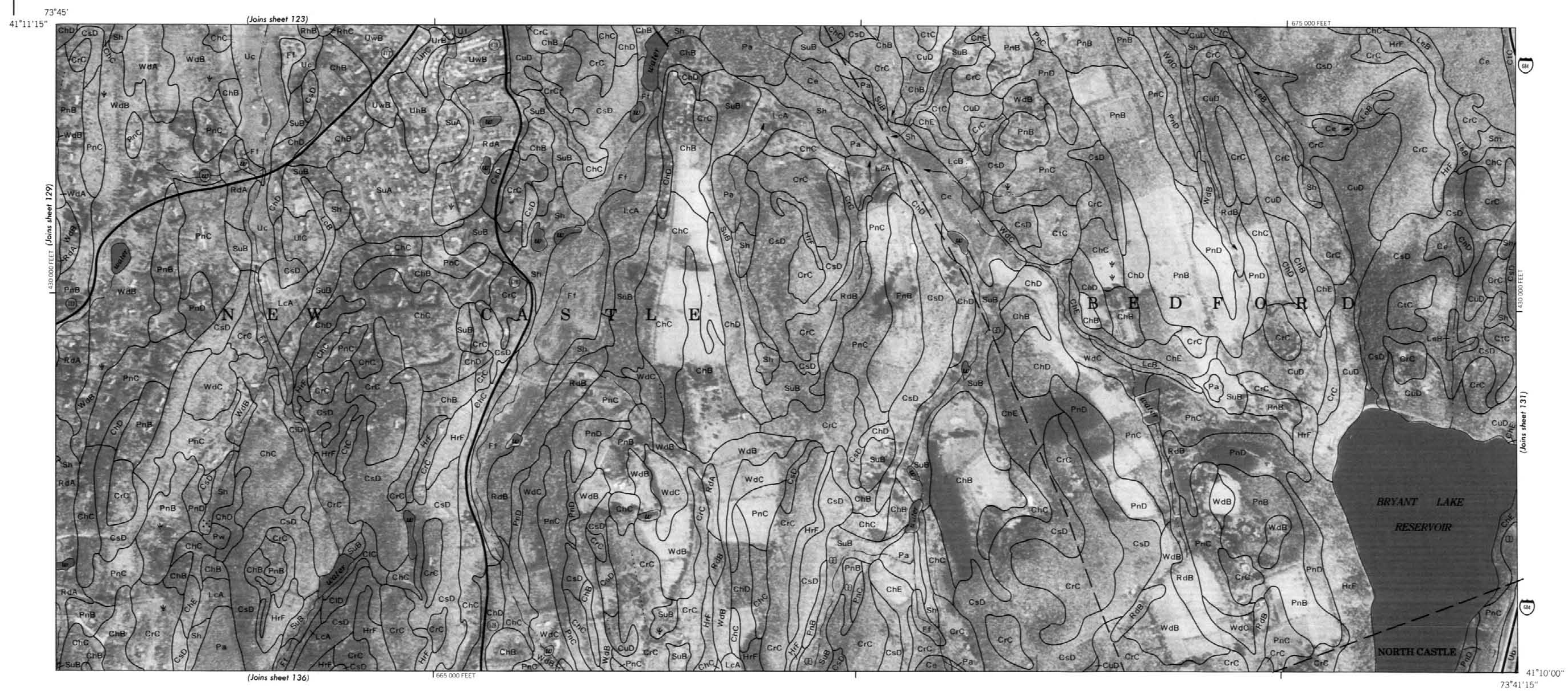


3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

SOIL SURVEY OF PUTNAM AND WESTCHESTER COUNTIES, NEW YORK — SHEET NUMBER 130

N



3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 130

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

131

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 131

(Joins sheet 124)

73°37'30"
41°11'15"

680 000 FEET

(Joins sheet 130)

(Joins sheet 132)

430 000 FEET

41°10'
73°41'15"

(Joins sheet 137)

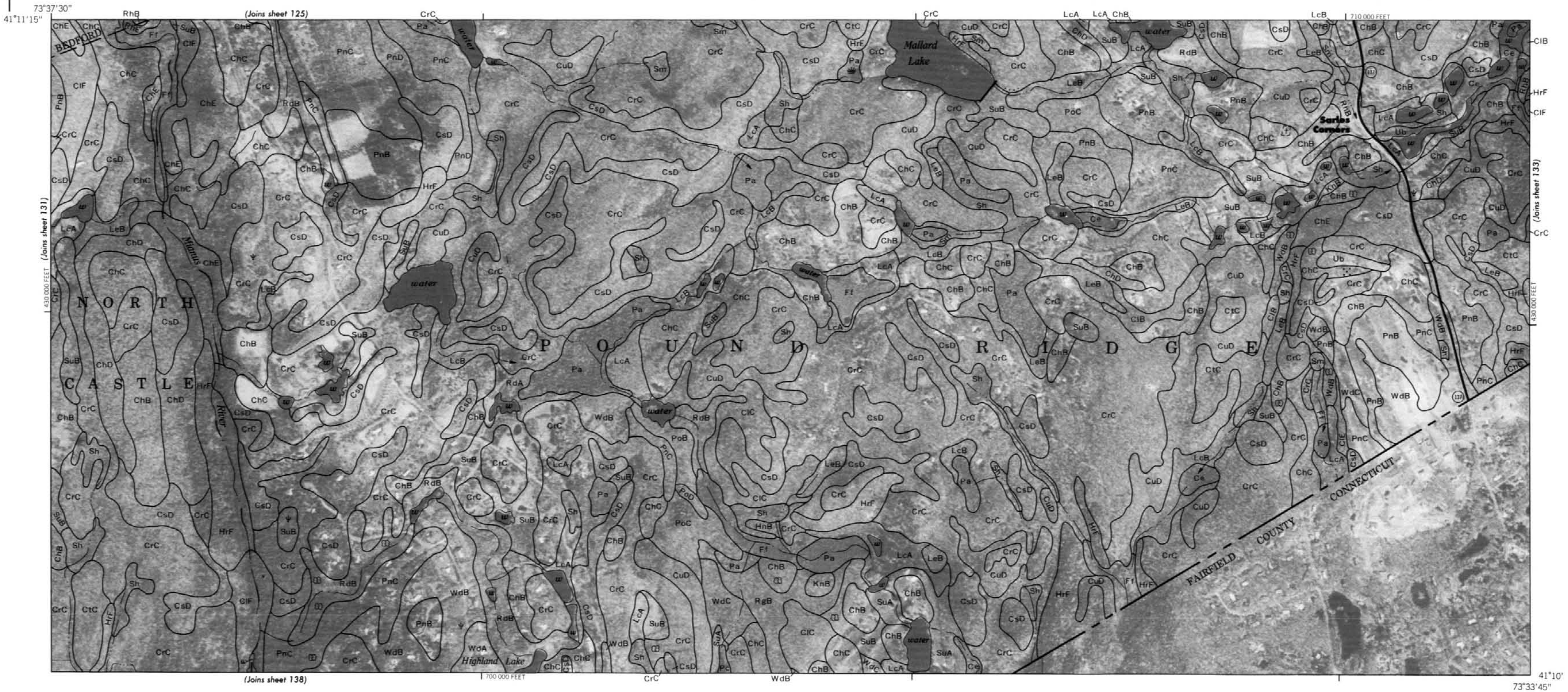
695 000 FEET

3000 FEET 500 0 25 .50 MILES

1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

132

N



3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 132

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

133

N

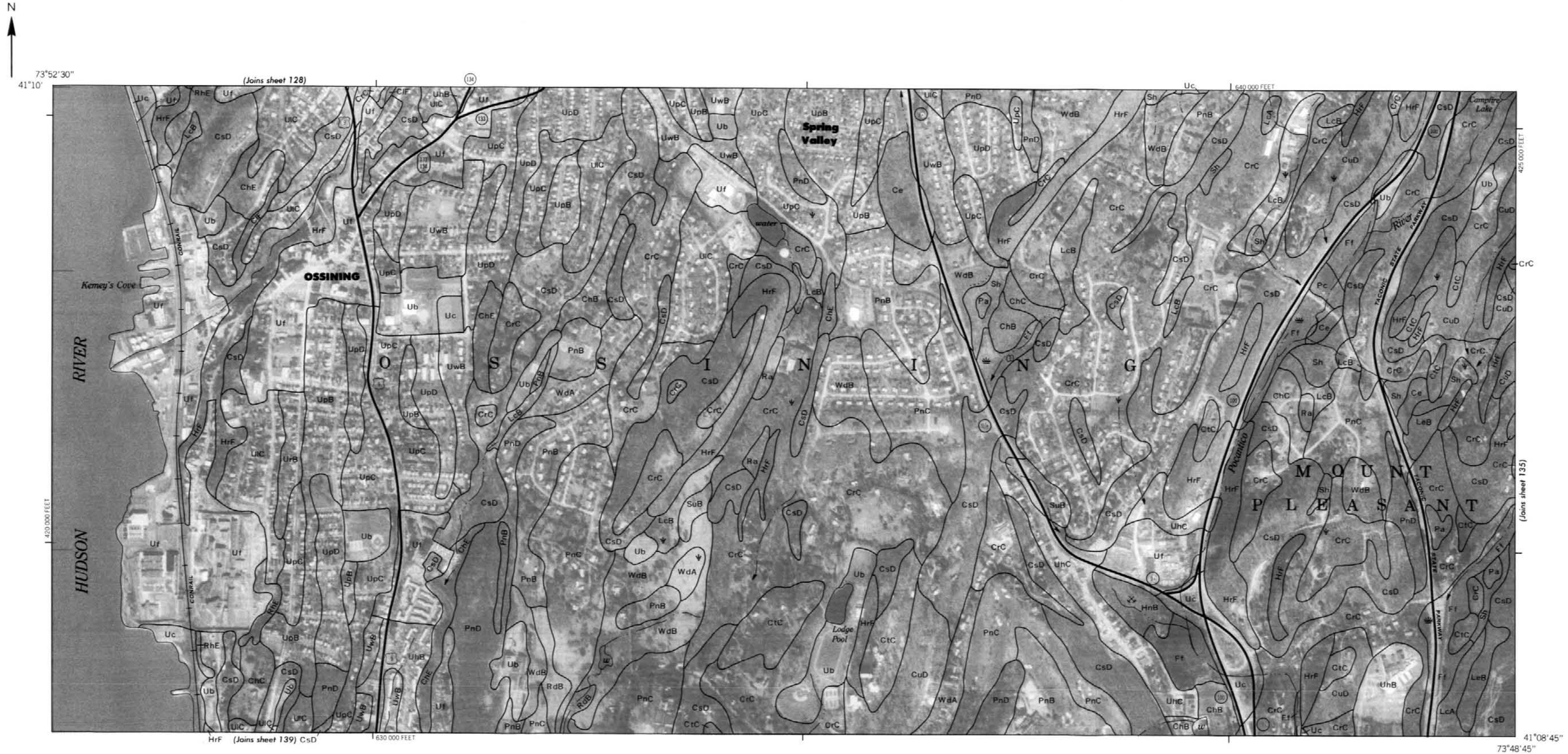
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 133

3000 FEET 500 0 25 50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

SOIL SURVEY OF PUTNAM AND WESTCHESTER COUNTIES, NEW YORK — SHEET NUMBER 134



3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 134

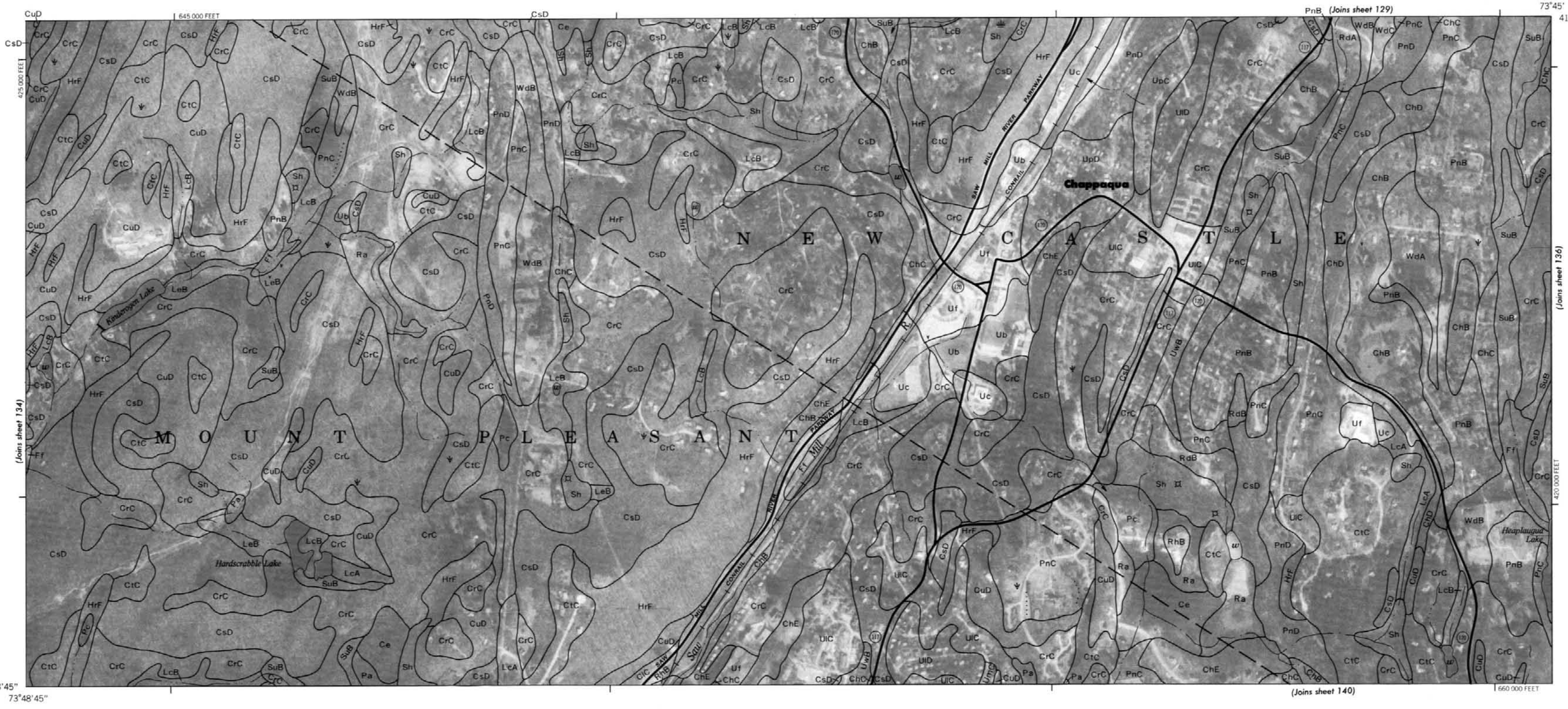
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

135

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 135



3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

136

N

3000 FEET 500 0 25 50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 136

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

137

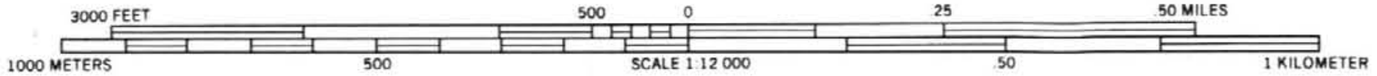
N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 137

3000 FEET 500 0 25 50 MILES

1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER



PUTNAM & WESTCHESTER COS., NEW YORK NO. 138

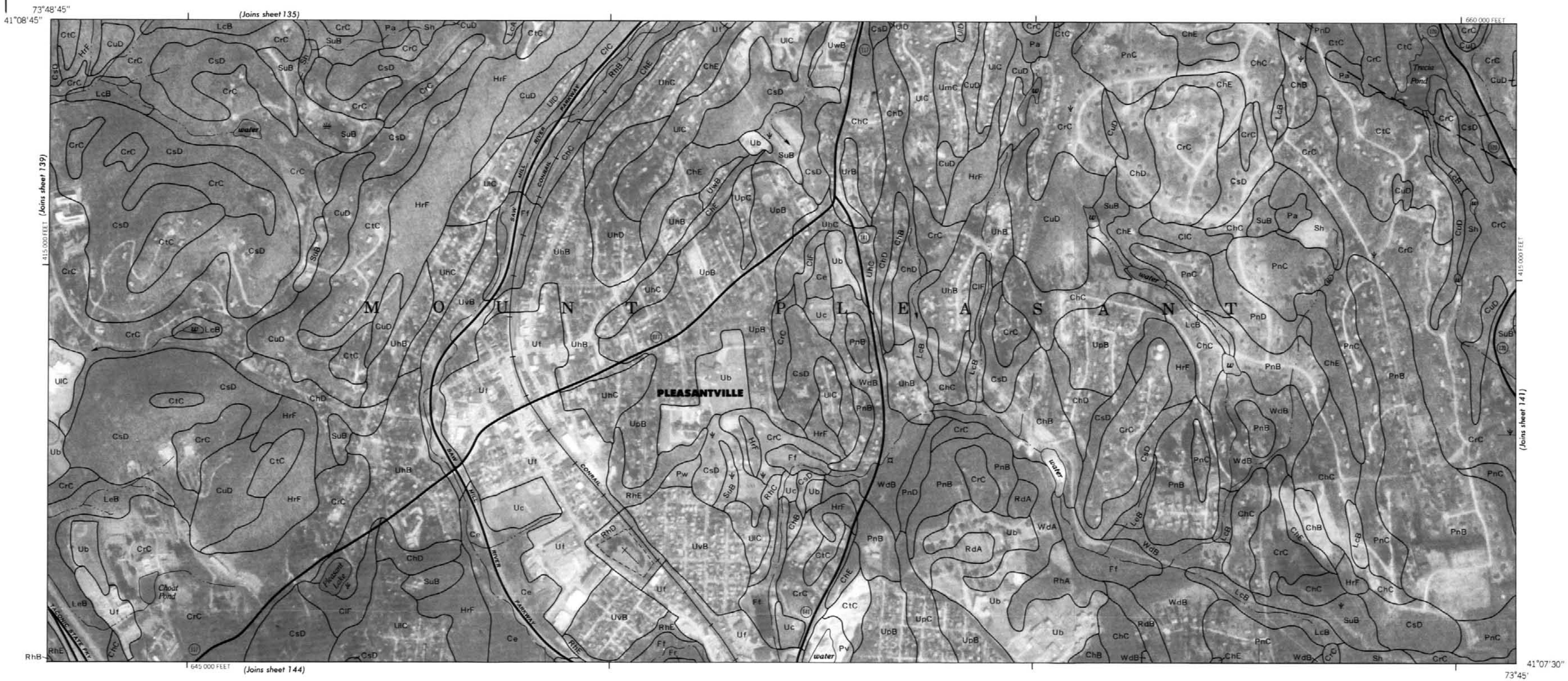
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 139

140

N



PUTNAM & WESTCHESTER COS., NEW YORK NO. 140

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

141

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 141

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 142

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

143

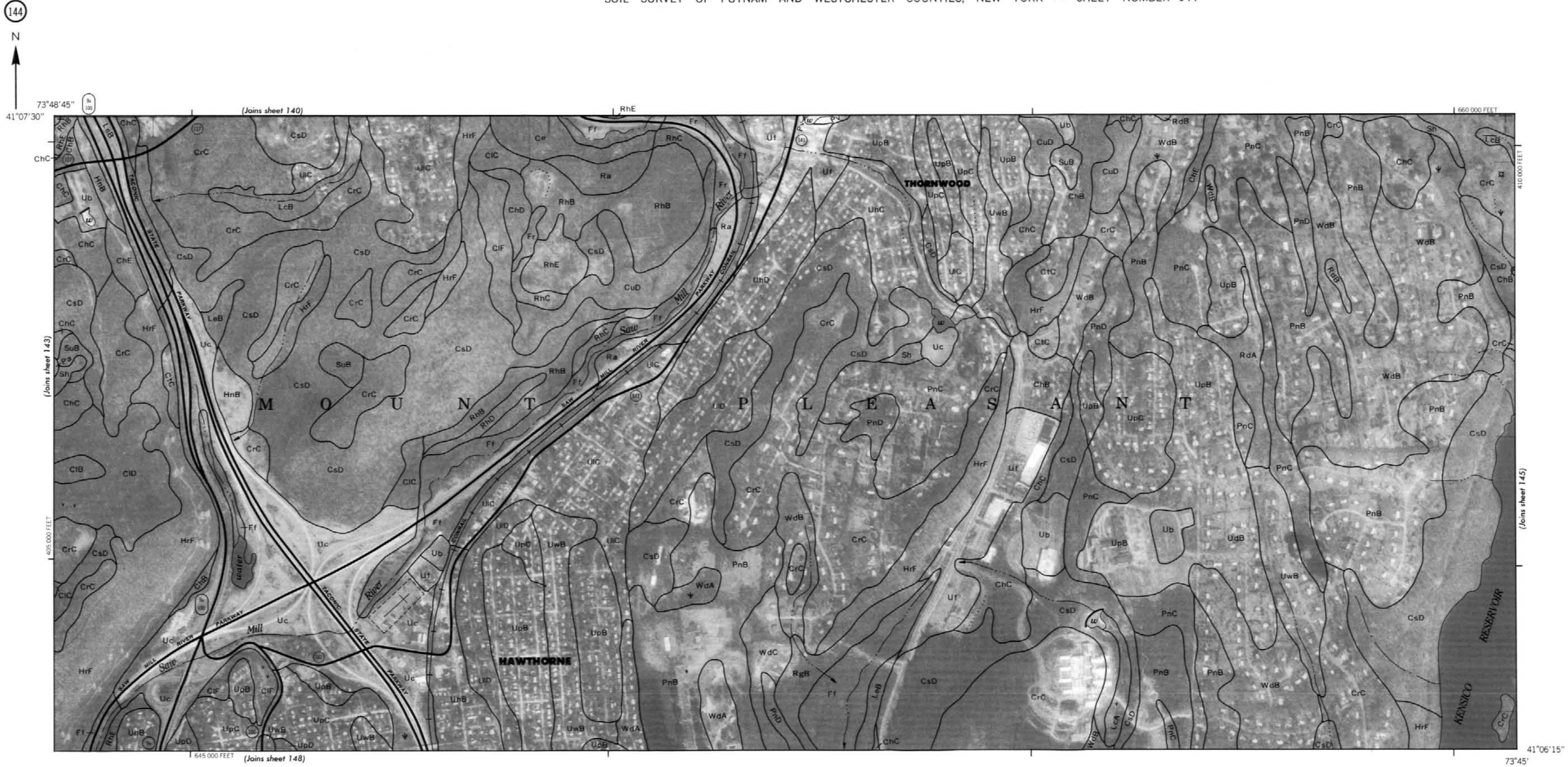
N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 143

3000 FEET 500 0 25 50 MILES

1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER



3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 144

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 · 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

145

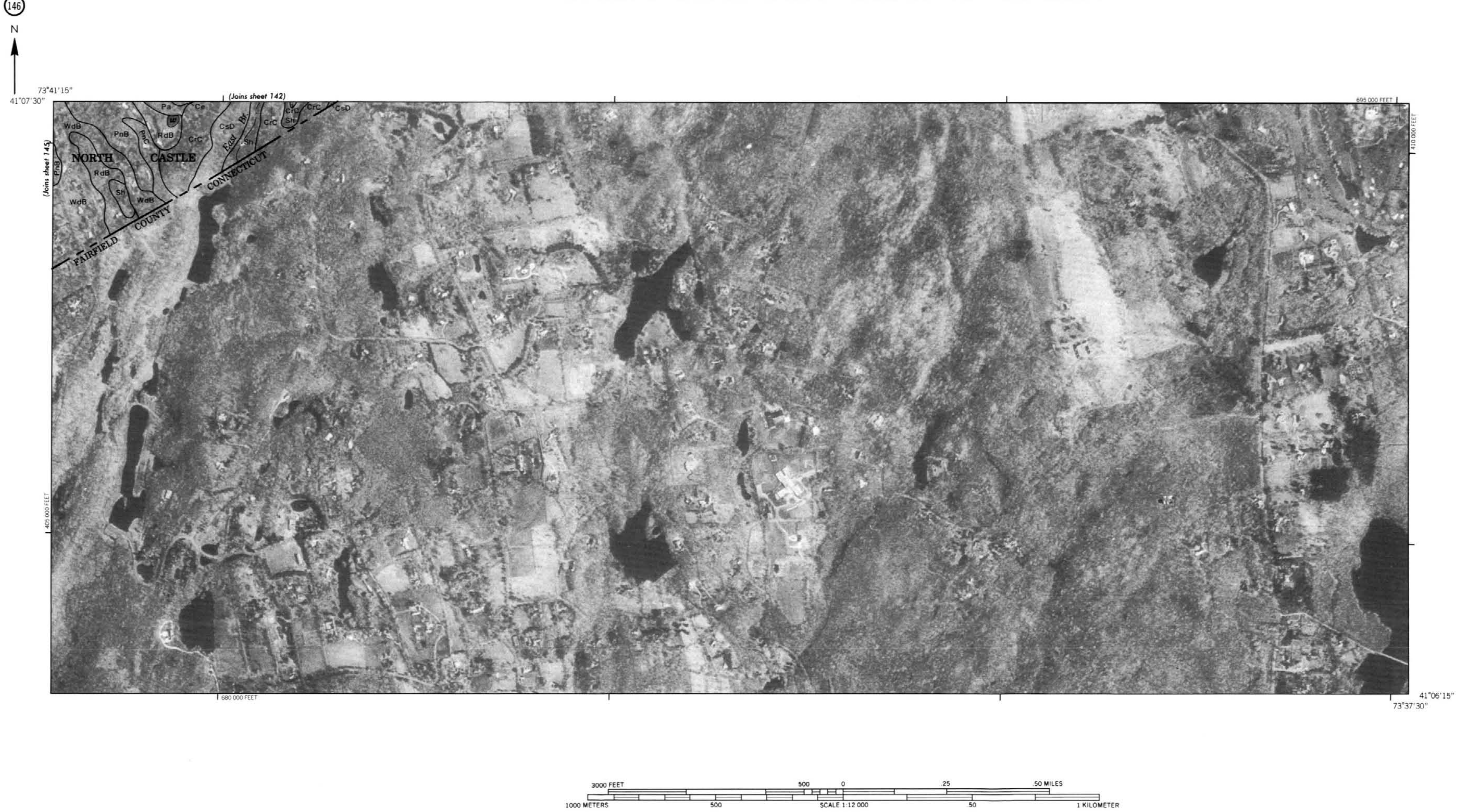
N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 145

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER



PUTNAM & WESTCHESTER COS, NEW YORK NO. 146

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

147

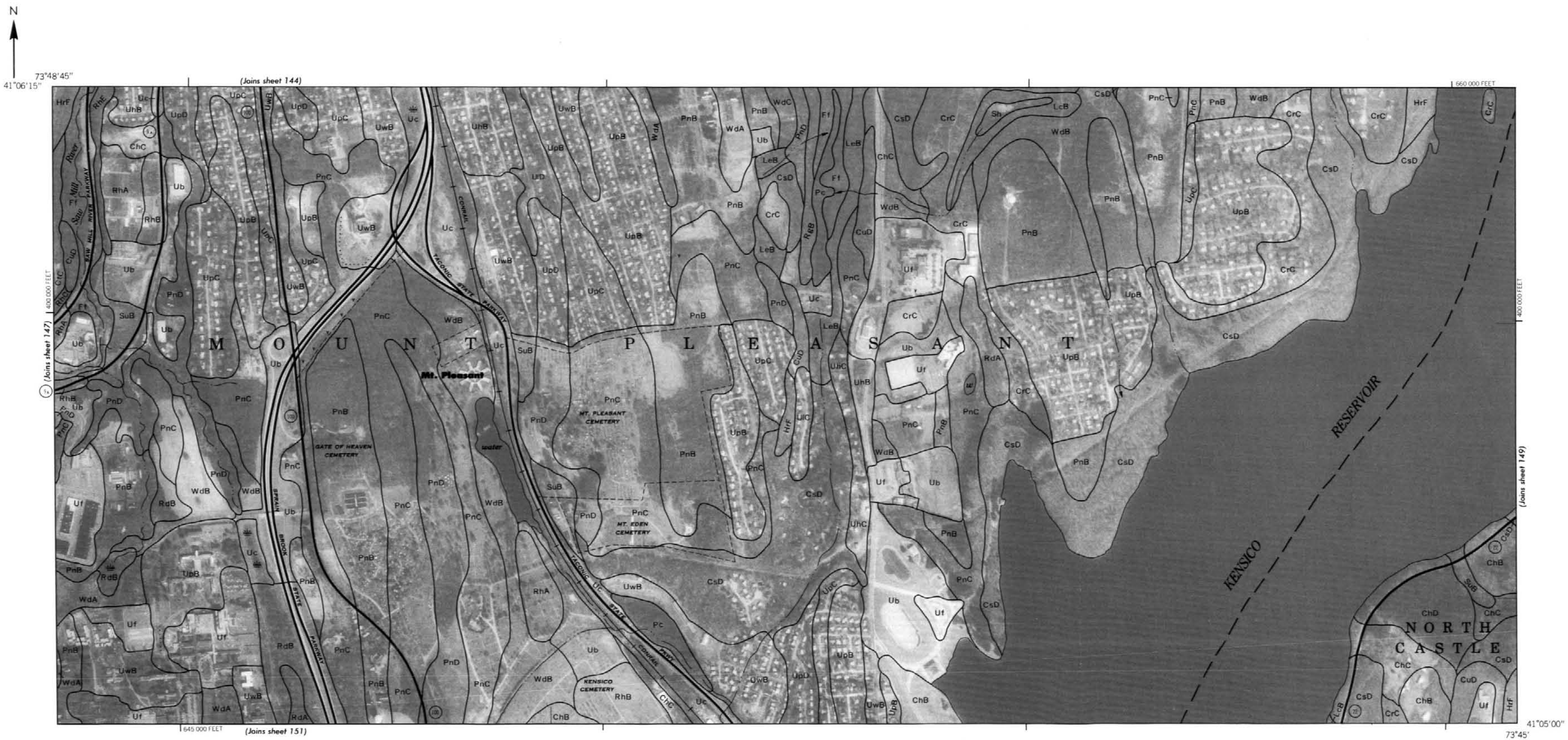
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 147

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

148



3000 FEET 500 0 25 50 MILES
1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 148

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

149

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 149

PUTNAM & WESTCHESTER COS., NEW YORK NO. 150

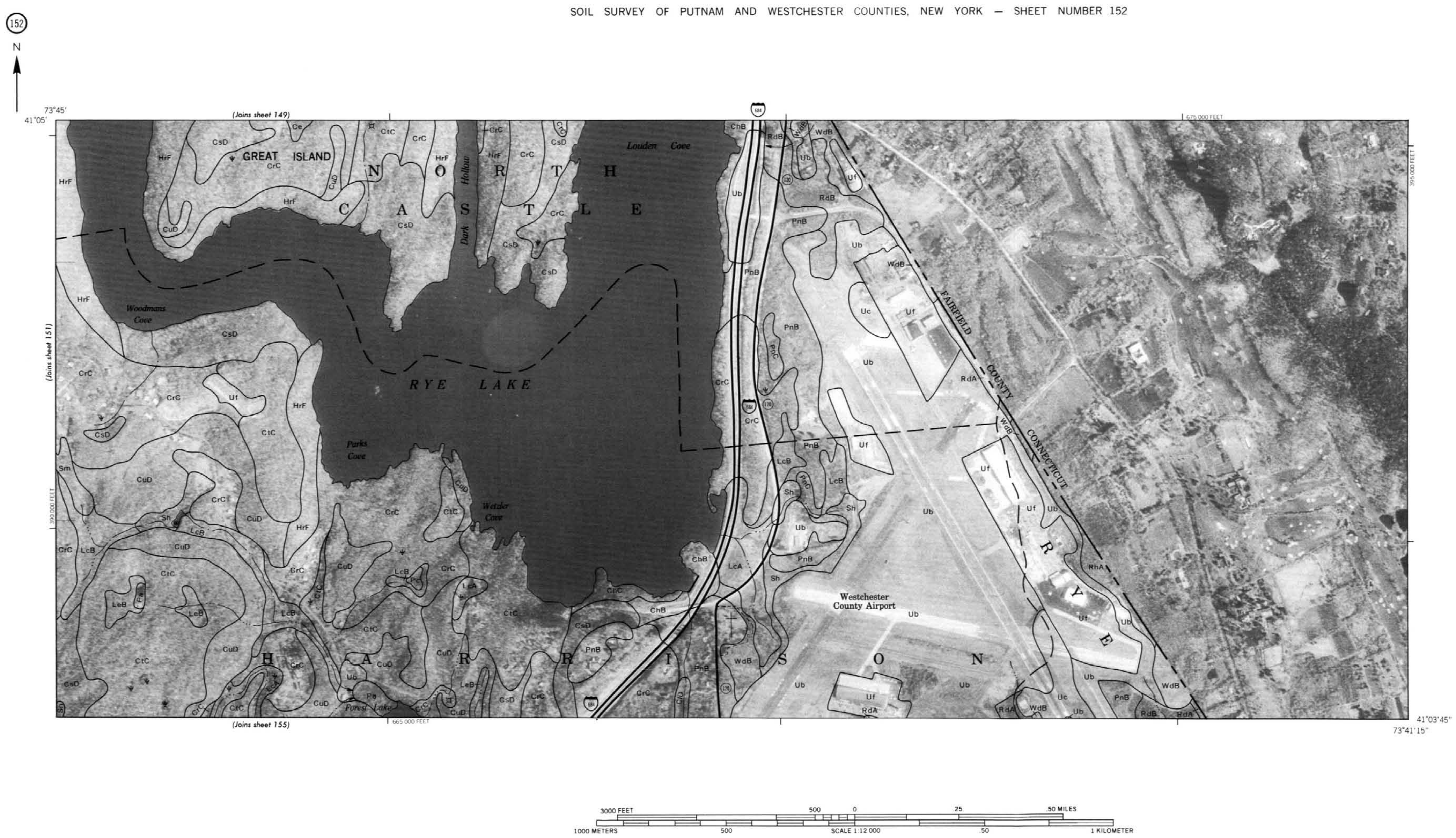
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 151

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER



PUTNAM & WESTCHESTER COS., NEW YORK NO. 152

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies.
Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial
photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 153

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

154

N

73°48'45"

41°03'45"

(Joins sheet 151)

(Joins sheet 153)

(Joins sheet 155)

660 000 FEET

385 000 FEET

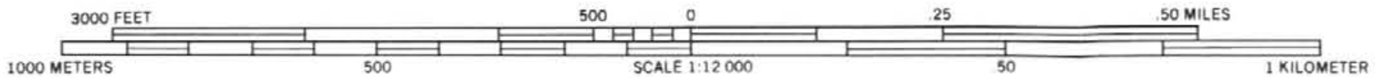
380 000 FEET

645 000 FEET

(Joins sheet 158)

41°02'30"

73°45'



PUTNAM & WESTCHESTER COS., NEW YORK NO. 154

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

155

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 155

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

156

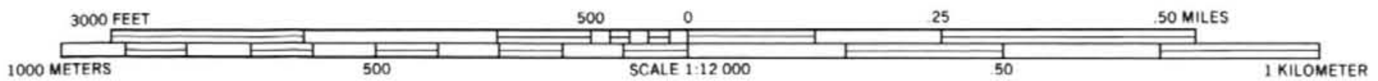
N

73°56'15"
41°02'30"

41°01'15"
73°52'30"

3000 FEET 500 0 .25 .50 MILES
1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 156
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 157

PUTNAM & WESTCHESTER COS., NEW YORK NO. 158

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

159

N

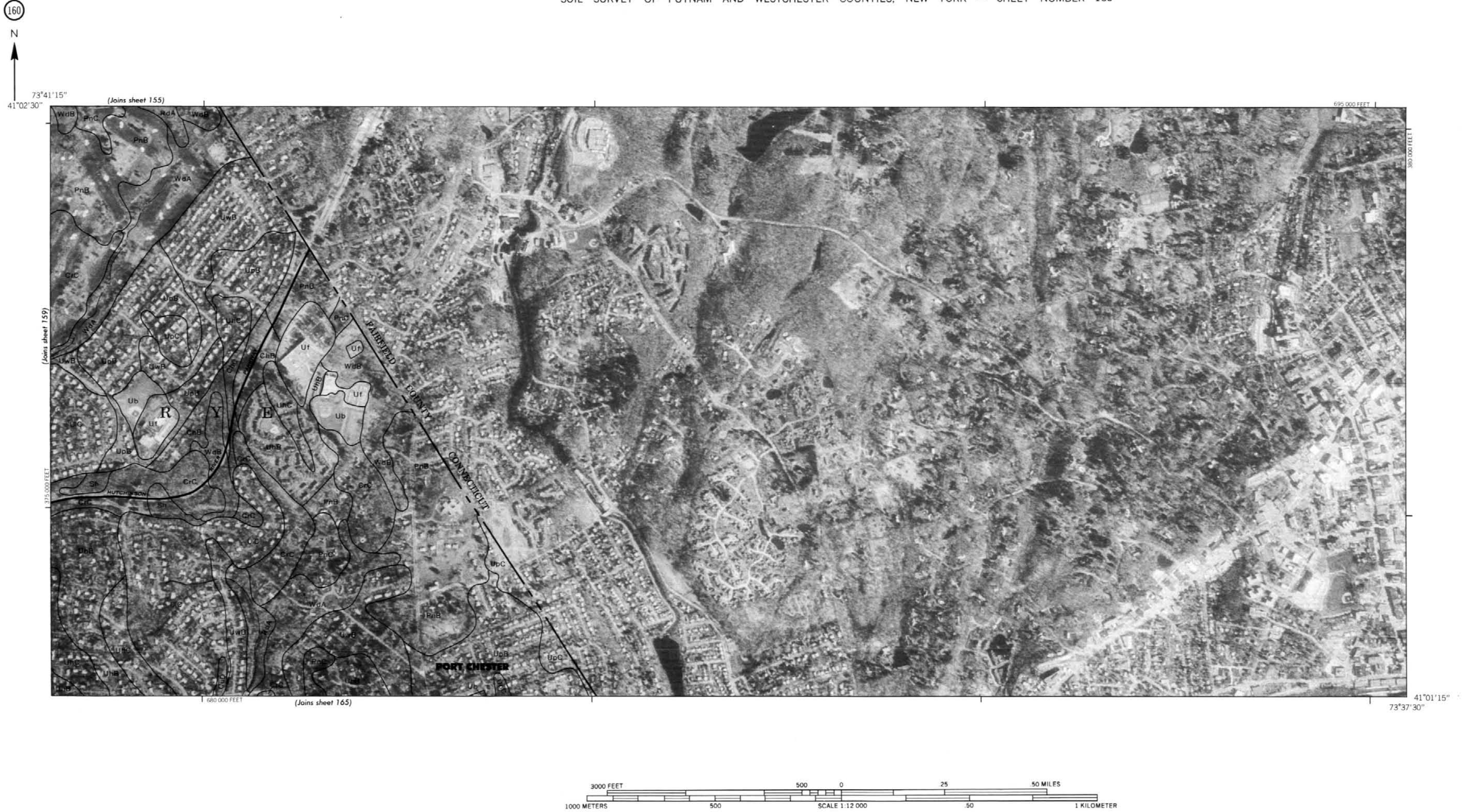
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 159

73°41'15"
41°02'30"

41°01'15"
73°45'

3000 FEET 500 0 .25 .50 MILES
1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

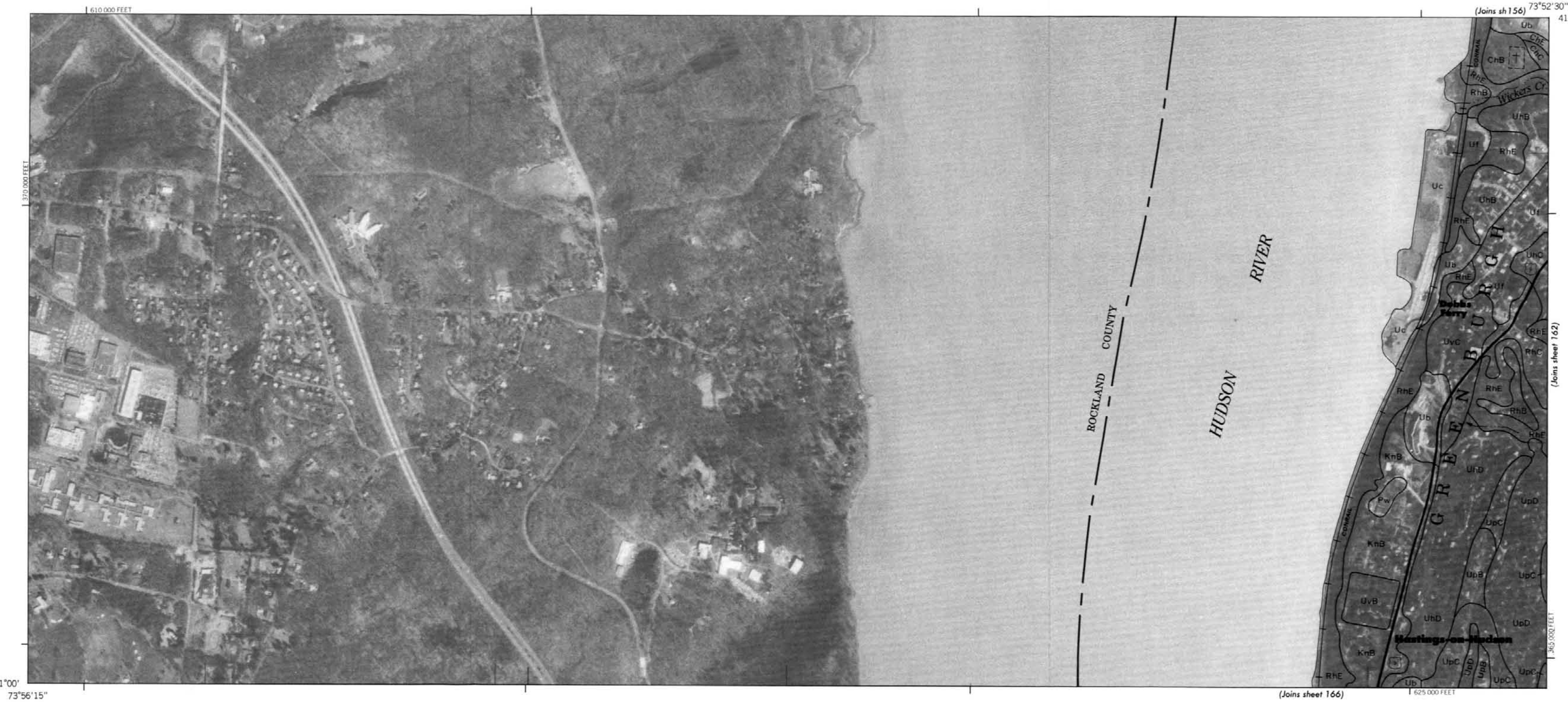


PUTNAM & WESTCHESTER COS., NEW YORK NO. 160

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

161

N



3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 161

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 162

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

163

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

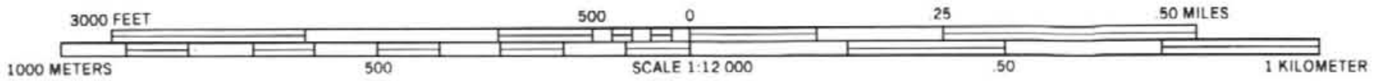
PUTNAM & WESTCHESTER COS., NEW YORK NO. 163

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

(164)

N



PUTNAM & WESTCHESTER COS., NEW YORK NO. 164

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 165

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

166

PUTNAM & WESTCHESTER COS., NEW YORK NO. 166

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

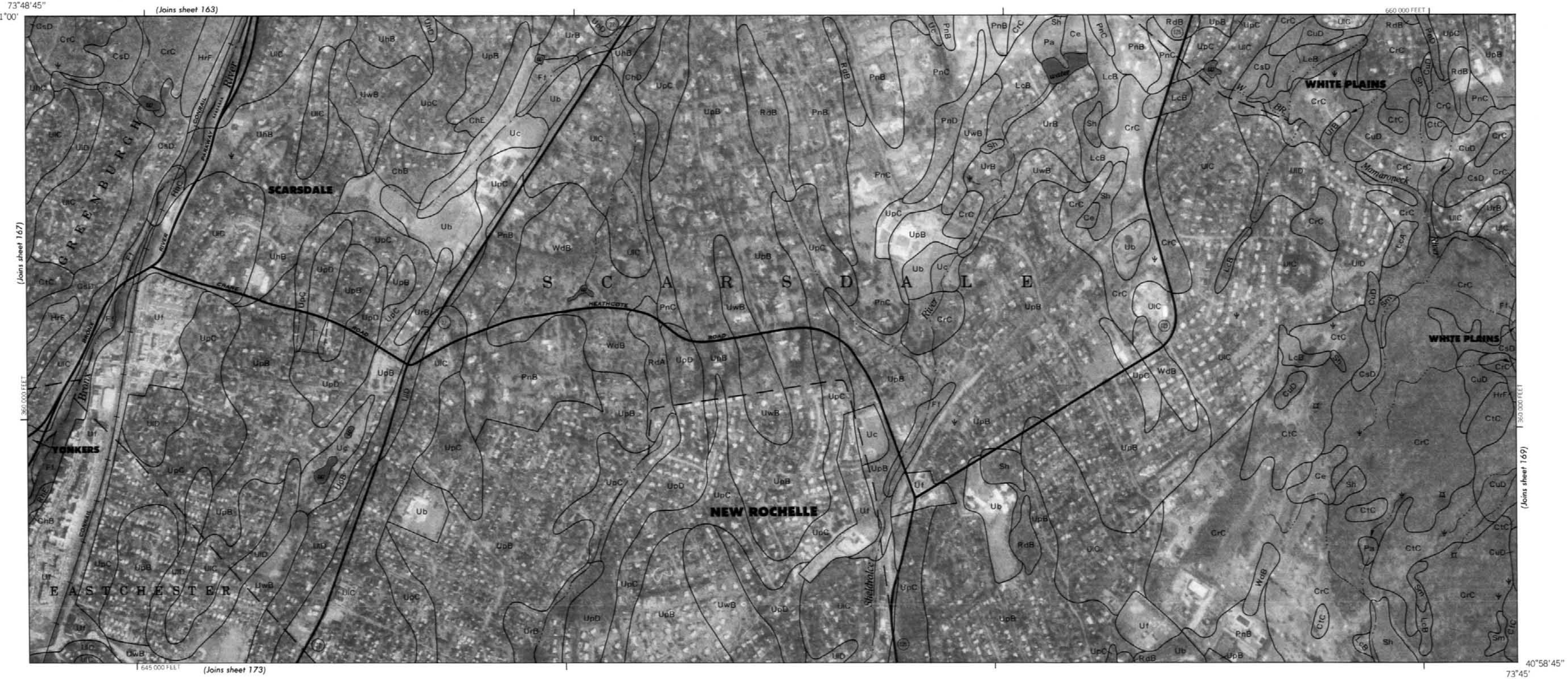
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies.
Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial
photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 167

3000 FEET 500 0 .25 .50 MILES
1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

168

N



3000 FEET		500	0	.25	.50 MILES
1000 METERS	500		SCALE 1:12 000	.50	1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 168

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

169

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 169

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

170

N

3000 FEET 500 0 .25 .50 MILES
1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 170

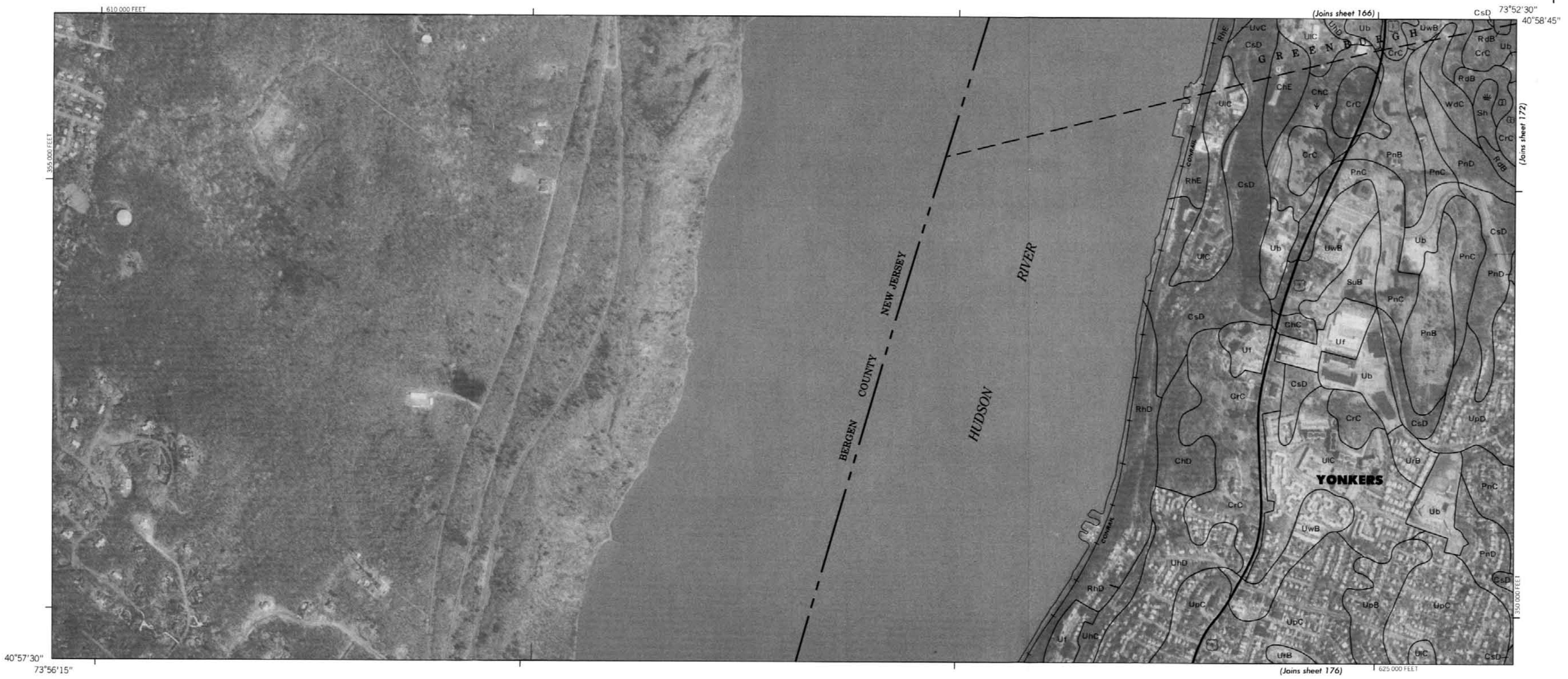
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

171

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 171

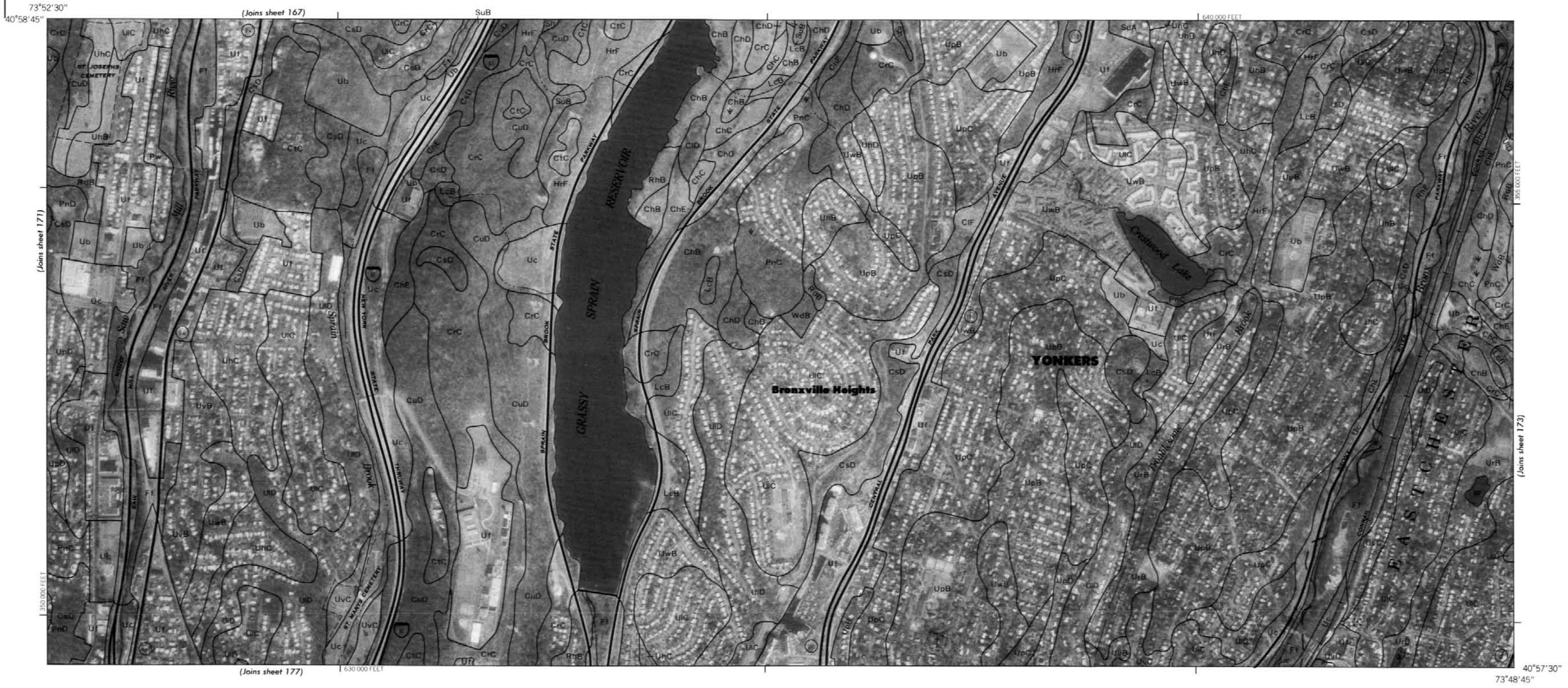


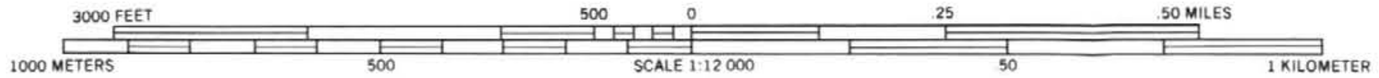
3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

172

N





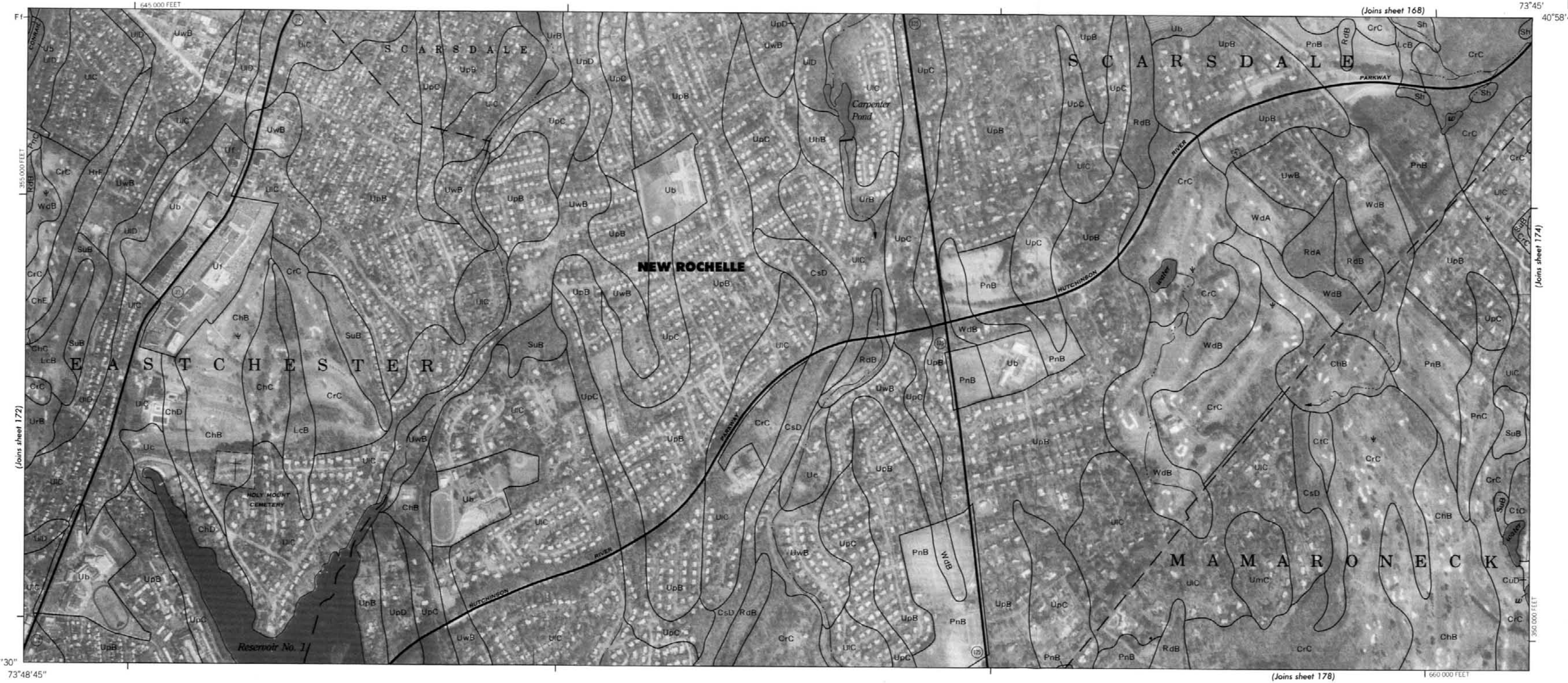
PUTNAM & WESTCHESTER COS., NEW YORK NO. 172

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 173



3000 FEET 500 0 25 .50 MILES

1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

174

N

3000 FEET 500 0 25 50 MILES
1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 174

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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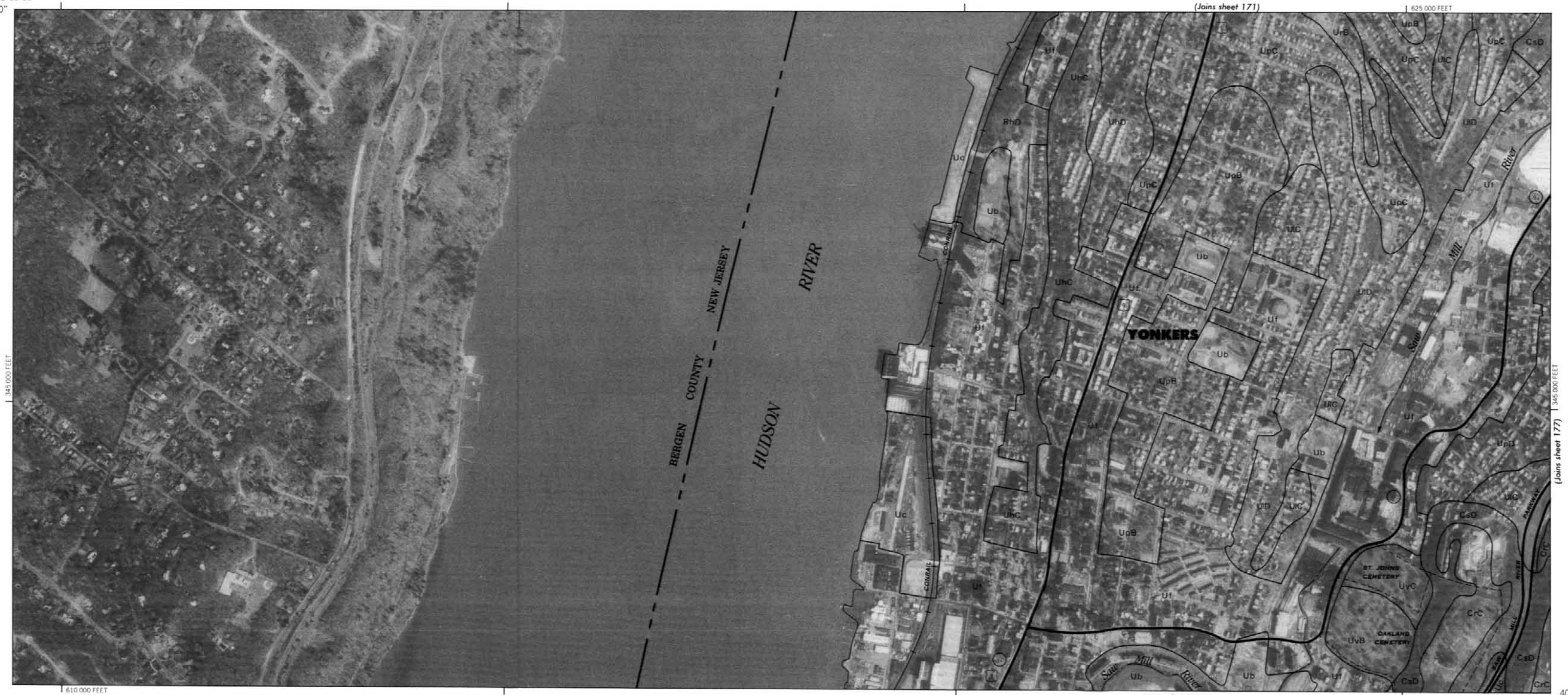
PUTNAM & WESTCHESTER COS., NEW YORK NO. 175

176

N



3000 FEET 500 0 25 50 MILES
1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 176

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

177

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies.
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PUTNAM & WESTCHESTER COS., NEW YORK NO. 177

(Joins sheet 172)

73°48'45"
40°57'30"

630 000 FEET

(Joins sheet 176)

(Joins sheet 178)

345 000 FEET

40°56'15"
73°52'30"

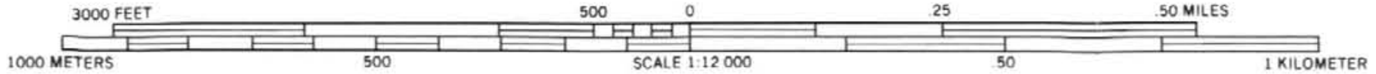
640 000 FEET

(Joins sheet 182)

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

178



PUTNAM & WESTCHESTER COS., NEW YORK NO. 178

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies.
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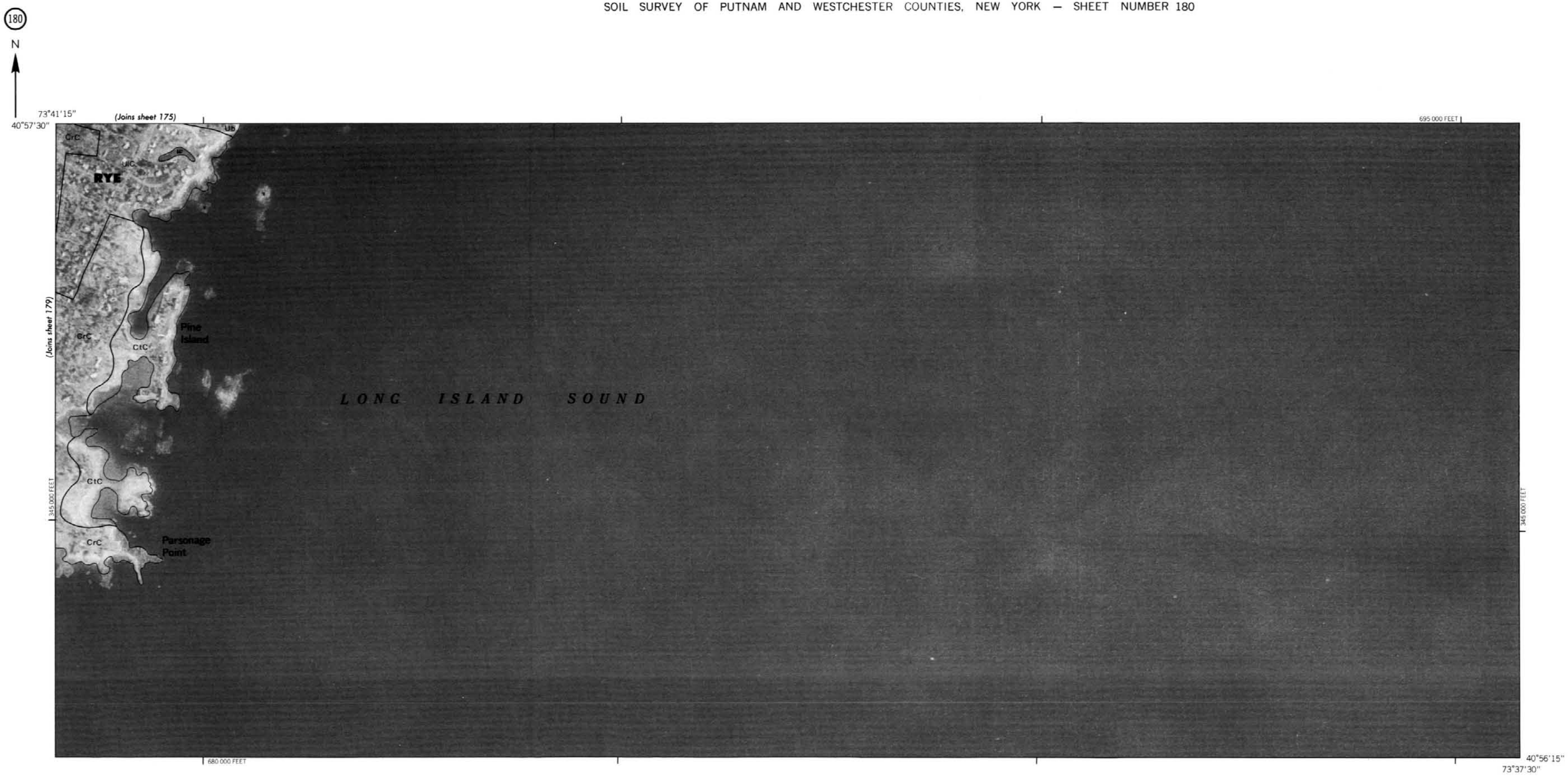
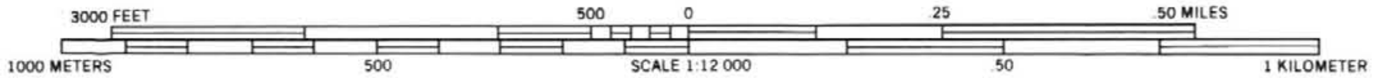
PUTNAM & WESTCHESTER COS., NEW YORK NO. 179

3000 FEET 500 0 25 50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER





PUTNAM & WESTCHESTER COS., NEW YORK NO. 180

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

181

N

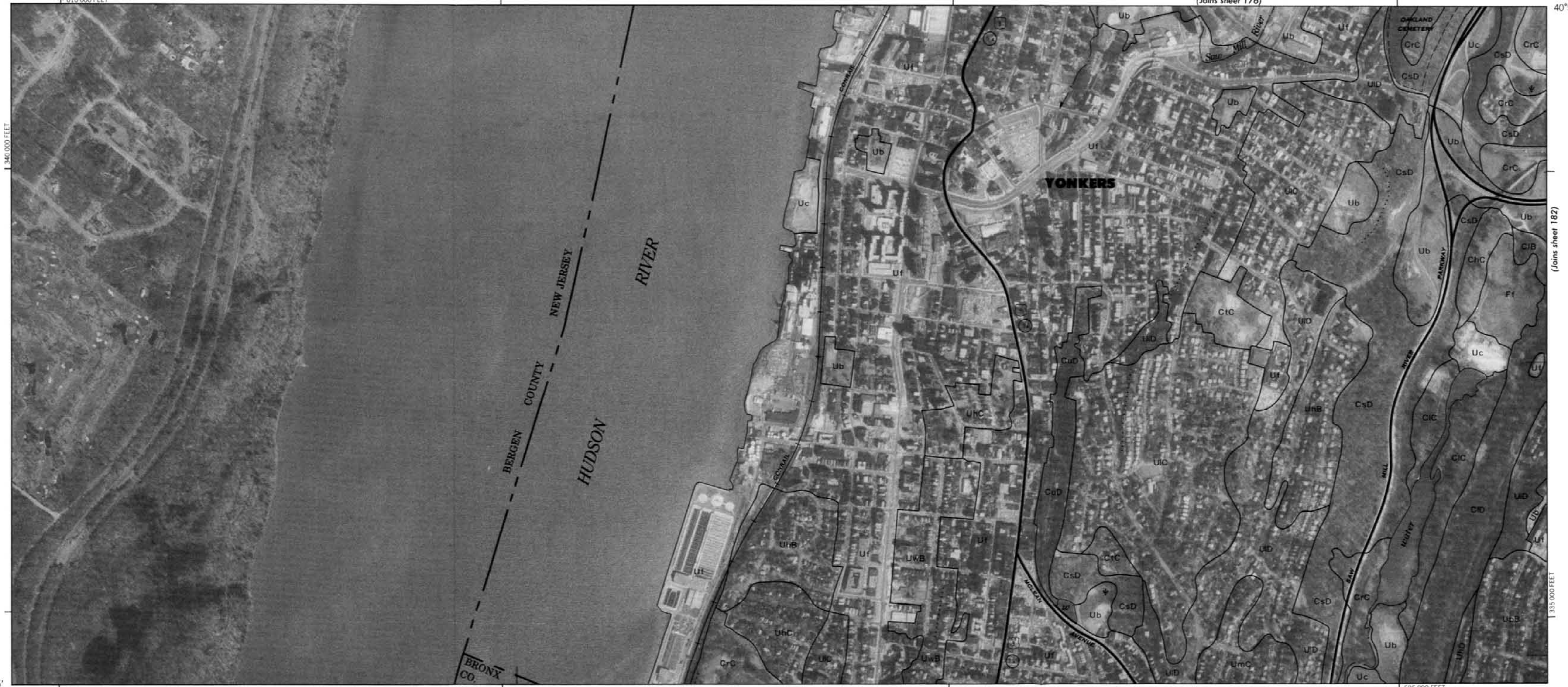
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.
PUTNAM & WESTCHESTER COS., NEW YORK NO. 181

610 000 FEET

(Joins sheet 176)

73°52'30"
40°56'15"

340 000 FEET



(Joins sheet 182)

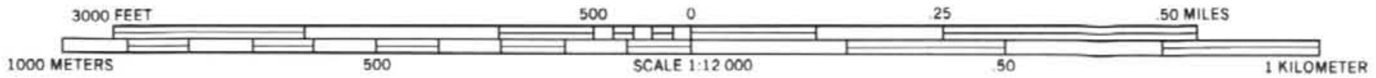
335 000 FEET

40°55'
73°56'15"

(Joins sheet 185)

625 000 FEET

3000 FEET 500 0 25 .50 MILES
1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER



PUTNAM & WESTCHESTER COS., NEW YORK NO. 182

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

183

N

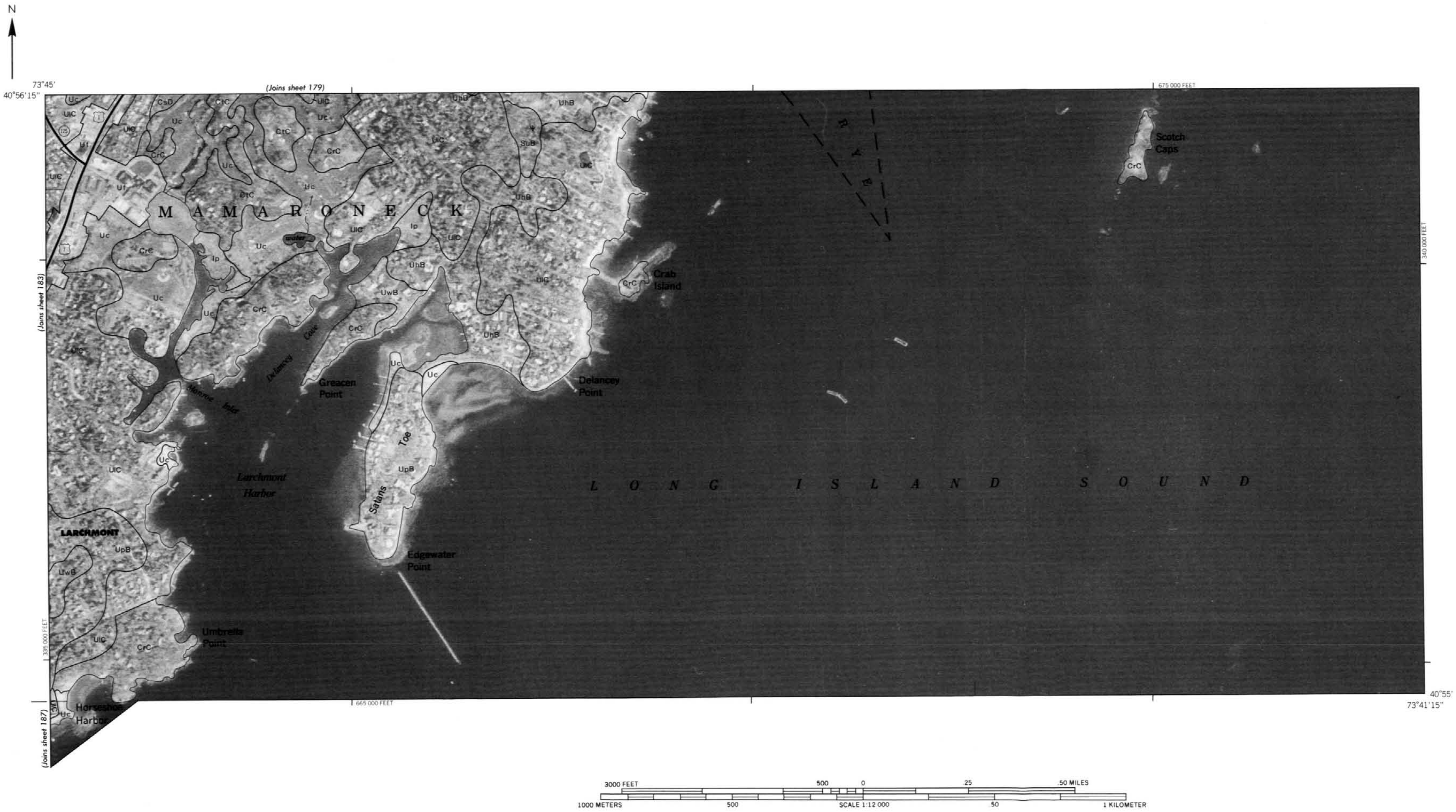
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 183

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

184



PUTNAM & WESTCHESTER COS., NEW YORK NO. 184

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

185

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies.
Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial
photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 185

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

186

N

3000 FEET 500 0 .25 .50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS, NEW YORK NO. 186

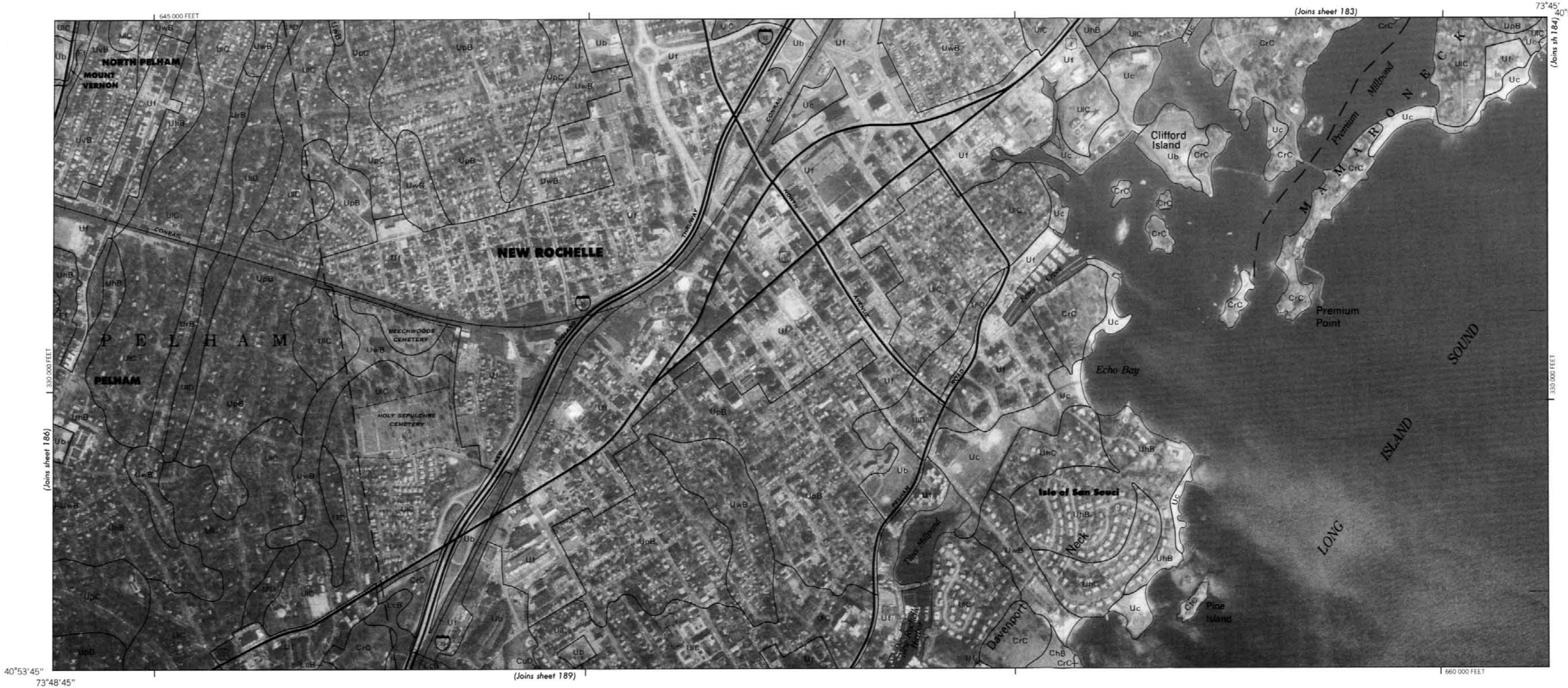
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

187

N

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

PUTNAM & WESTCHESTER COS., NEW YORK NO. 187



3000 FEET 500 0 25 50 MILES

1000 METERS 500 SCALE 1:12 000 .50 1 KILOMETER

PUTNAM & WESTCHESTER COS., NEW YORK NO. 188

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1984 - 1985 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

3000 FEET 500 0 25 50 MILES

1000 METERS 500 SCALE 1:12 000 50 1 KILOMETER

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PUTNAM & WESTCHESTER COS., NEW YORK NO. 189